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REVIEW OF DEFENSE DEPARTMENT AND INTELLIGENCE COMMUNITY ACTIONS, GULF WAR VETERANS' HEALTH, AND IMPLICATIONS FOR THE FUTURE

INTRODUCTION

Key to determining why and how some Gulf War veterans have developed health problems since their deployment to the Middle East in 1990 is gaining an understanding of the state of U.S. military preparedness for conducting operations in that environment. Such an understanding must also be considered in the context of the perceived threat that Iraq might use chemical or biological weapons (CBW) in that war. Moreover, the lessons learned from that experience are critical to helping ensure that in the future no veteran's health is adversely affected during military service by circumstances that can reasonably be avoided or prevented.

In the fall of 1990, as American troops and allies began to arrive in the Persian Gulf region to initiate Operation Desert Shield, U.S. intelligence resources were already well aware of Iraq's ability to manufacture and use chemical and biological weapons. The news media was rife with speculation about the possibility of an Iraqi chemical weapons strike. There was good reason for this: the Iran-Iraq war during most of the 1980s left no doubt that given the opportunity, Iraq would employ chemical weapons on the battlefield. Awareness of the impact that chemical weapons could have on fighting forces had been an element of U.S. military training doctrine long before the Gulf War, but defense against chemical warfare had not been a priority during actual troop training.

The possibility that biological weapons could be used against coalition forces was also of concern to the U.S. government. While it was generally believed that chemical agents could be detected and, to some degree, countered, the United States' ability to detect biological weapons was almost nonexistent. Iraq's known chemical and biological production and storage facilities were, therefore, high on air strike priority lists.

By December of 1990, the likelihood of a ground war—and with it the possibility of chemical or biological warfare—triggered a decision to vaccinate some U.S. troops against anthrax. Department

of Defense and Food and Drug Administration officials were also developing guidelines for use of pyridostigmine bromide (PB), which was hoped would counter the effects of some chemical nerve agents, and for use of a botulinum toxoid vaccine. (For expanded information on these topics, see Chapter Three.) Fox vehicles, which are German-manufactured systems to detect the presence of chemical weapons, were brought into the theater during Operation Desert Shield. The M8A1 chemical alarm—a freestanding or vehicle mounted device—was also widely distributed throughout the region. Intelligence suggesting that Iraq could launch CBW-armed missiles into well-populated areas around the theater of operations heightened in-theater awareness of the need for good CBW protection.

Intelligence reports showed that Iraq had stockpiles of chemical and biological weapons scattered across the country. Strategies were developed by the Joint Chiefs of Staff (JCS) to attempt to neutralize as much of Iraq's chemical and biological production and capacity as possible during the Gulf War's air campaign phase, which began on January 17, 1991. The public was riveted by almost-real-time images of U.S. laser-guided munitions crashing into bunkers and other Iraqi military installations. These images, and reports of the destruction of Iraqi chemical and biological weapons production and storage sites, would again come under scrutiny many years later in attempts to reconstruct what happened during the war.

When the ground war finally got underway on February 24, 1991, the speed with which it was executed caused large numbers of U.S. troops to sweep through Iraqi defenses so fast they could not always fully account for what they had just encountered. An objective known to the military by one name often had another name to intelligence-gatherers, and yet another name that was commonly used by local residents. As a result, post-war cleanup plans, including those directing demolition team operations, were sometimes vague in details about specific areas to be cleared.

This chapter is built on several underlying findings. The first is that U.S. forces operating in the Southwest Asian theater during Desert Shield and Desert Storm were not always adequately supported by reliable or timely intelligence and communications. Good intelligence is a critical element both in the direct prosecution of war and in determining acceptable day-to-day operational risks for the soldiers, sailors, airmen, and Marines who may be called on to fight. This chapter's centerpiece case study, the demolition of the Khamisiyah ammunition complex in southeastern Iraq in March 1991, is an example of how intelligence and communications failures before, during, and after that event had not only the potential for placing U.S. personnel at an unacceptable level of risk, but in fact may have jeopardized the health of many American troops.

Even with the best intelligence, U.S. forces could still be faced with chemical or biological weapons or other materials (such as depleted uranium) with potentially hazardous side effects to those who use them or work around them on and off the battlefield. Therefore, the SIU investigation took a hard look at DOD's policies and plans for training, warning, and protecting troops from the hazards of such agents and materials. The results of this aspect of the investigation showed serious

training shortfalls in chemical and biological agent awareness and in other hazardous materials training doctrine. There were glaring deficits in the ability of fielded alarm systems to provide reliable warnings of impending chemical or biological agent exposures. There was poor medical record keeping with respect to potential health-risk exposures. And there was a critically inadequate supply of personal protection equipment available.

Finally, the SIU looked at record keeping as a tool for helping piece together events before, during and after the deployment. Such records can yield information relevant to veterans' health claims and can provide a scientific foundation for future health-risk research. The investigative staff found that the Department of Defense failed to maintain adequate records of critical health-risk events before, during, and after the Gulf War. This failure has brought into question for many the government's efforts to provide the best possible health care and benefits to Gulf War veterans. The failure to keep and maintain adequate records also undermines the ability of scientists to study a broad constellation of in-theater health risks with any degree of confidence in the available data.

In short, without good planning and sharing of intelligence, without adequate preparation in training and materials, and without adequate record keeping, neither the Department of Defense nor the Department of Veterans Affairs can adequately account for events or conditions that may ultimately have affected the health of Gulf War veterans or may affect veterans of conflicts in the future.

THE KHAMISIYAH WEAPONS DEPOT DEMOLITION

The Khamisiyah weapons depot was a large facility in southern Iraq targeted for destruction by U.S. forces in early March of 1991. The story of Khamisiyah is one of confused location identities, inaccurate records, conflicting personal recollections, possible chemical exposure health risks, and claims of Pentagon cover-up after the fact. It illustrates issues common to many other events during the Gulf War. Following the narrative of the Khamisiyah incident is a discussion of other possible similar events, the effectiveness of chemical detection systems used at the time, and related battlefield health risk issues such as depleted uranium.

March 2-4, 1991—The Khamisiyah main depot complex (see maps reproduced at Appendix A) consisted of approximately 100 weapons storage bunkers distributed in an approximately nine square kilometer area and a smaller area—a kidney-shaped depression approximately 1,000 feet long and 300 feet across (widely referred to as the “pit”) about two kilometers southwest of the larger complex. It is important to distinguish between the bunker and pit sites, since eyewitness accounts and contemporaneous intelligence reports did not always accurately describe the place and time of events in the Khamisiyah area in early March of 1991. Explosive ordnance disposal (EOD) teams from the 37th Engineer Battalion and the 307th Engineer Brigade arrived at the main bunker complex on March 2, 1991 with the purpose of investigating and demolishing what they believed at the time was one large weapons storage facility. The teams destroyed 37 bunkers in the main complex on

March 4. Prior to the detonations, troops from the 37th Engineer Battalion and the 307th Engineer Brigade inspected each bunker using M8A1 alarms designed to detect the presence of a range of chemical weapons agents, including mustard, sarin, tabun, and soman.²

M8A1 CHEMICAL DETECTION ALARMS

The M8A1 is a stand-alone or vehicle mounted device composed of a sensor and a horn which, when connected by a long wire, can be detached and set up some distance from the sensor. There has been considerable debate about the effectiveness of the M8A1, particularly in light of evidence that the device can be “tricked” into falsely sounding by a variety of non-lethal agents, such as diesel and turbine engine fumes, pesticides, and fine, wind-blown particulates. Only once during demolition activity on March 4, 1991 when the 37 bunkers were exploded in the main Khamisiyah depot did a M8A1 chemical alarm sound. The alarm caused many, although not all, of the units present to put on full chemical protection gear (also known as “Mission Oriented Protective Posture Level-4” or “MOPP-4”). Chemical protection training regulations require all military personnel to proceed to MOPP-4 when chemical alarms sound. However, many troops at Khamisiyah felt this was just one of numerous false alarms that had occurred since the war began and did not do so.

Some soldiers also conducted tests to confirm the presence of chemical agents using a device called the M-256-A1 Chemical Agent Detector Kit, a hand-held card containing a variety of reactive chemicals that respond to the presence of certain agents by changing color. One test showed a partial positive reading for “persistent blister agent” but additional tests with other kits led those using them to conclude that no chemical agent was in fact present.³ Over the next six days the engineers prepared the depot for a final demolition of the entire facility.⁴

March 9, 1991—On March 9, 1991, during a second reconnaissance of the Khamisiyah depot and surrounding area, members of the 37th Engineer Battalion discovered stacks of 122mm rockets in the open pit-like area south of the main bunker complex. The rockets, covered by canvas tarps and dirt, were located along the pit’s southwestern wall. Soldiers of the 37th, along with two explosive ordnance specialists, began preparing the pit for destruction. In the process, they opened crates that were found to contain “unmarked rockets colored olive drab,” and they concluded that the rockets did not contain a chemical agent. This conclusion was based in part on the fact that M8A1 detectors that were used in the pit did not signal that any chemical agent was present.⁵ Moreover, although members of the 37th Engineer Battalion had a general knowledge that chemical weapons could be present at any given site, as discussed below they were not equipped with timely information from intelligence sources that caused them to specifically look for such weapons at the Khamisiyah depot.

CRITICAL SITE INFORMATION NOT PASSED TO DEMOLITION TEAM AT KHAMISIYAH

Information from human intelligence sources made available at the time to military decision-makers by the CIA warned of the possibility of chemical weapons in the Khamisiyah area.⁶ A report of an interview with an Iraqi prisoner of war declared that chemical weapons were present at “Objective Gold,” the name that the Army used to identify the Khamisiyah area.⁷ The Khamisiyah site, this time referred to as “Tall al Lahm,” also appeared on a “Suspect Chemical Weapons Site” list prepared by U. S. Central Command (CENTCOM). This list was provided to Army Central Command (ARCENT) as part of a request to determine by March 4 whether chemical or biological munitions were present at seventeen sites suspected to contain them.⁸

While this important intelligence was made available to military decision-makers, it is unclear to what extent any of this information reached the battalion, company, or unit level. For example, ARCENT failed to coordinate intelligence when an XVIII Airborne Corps message based on DIA information, dated 26 February 1991 and titled “Possible chemicals on OBJ. GOLD,” was sent to the 24th Infantry Division Mechanized and the 101st Airborne Division. That data was not sent to the 82nd Airborne Division which was ultimately assigned to the demolition of Khamisiyah.⁹

Intelligence also conflicted as to whether Iraqi chemical munitions were or were not marked with any consistency. In February of 1991, messages were sent by the XVIII Airborne Corps and the 20th Engineer Brigade to subordinate commands notifying units that a particular color pattern or number of rings could identify chemical munitions.¹⁰ SIU investigators learned that members of the 37th Engineer Battalion based their inspection of the bunkers and pit at Khamisiyah for chemical munitions on information consistent with this notification. These troops were not in the XVIII Airborne Corps chain of command and they did not receive a warning about the destruction of chemical ordnance published by the XVIII Airborne Corps on February 20, 1991. That warning stated that “at this time there are no known markings/color scheme on Iraqi chemical and biological munitions.”¹¹ Another message sent by the CIA to DOD’s intelligence (J-2) and operations (J-3) directorates in Riyadh through the Joint Intelligence Liaison Element on March 6, 1991 noted that the Iraqis in fact did not specifically mark munitions to indicate that they contain chemical agent. That message never reached the 37th Engineer Battalion.¹²

March 9-10, 1991—On March 9 and 10, 1991, soldiers of the 37th and the 307th set explosive charges among the cases of rockets in the pit at Khamisiyah. Due to the large size of the main Khamisiyah depot and other Iraqi munitions storage sites being destroyed, available supplies of demolition explosives usually used for such purposes were limited. This shortage caused the EOD personnel in the pit to resort to the use of a variety of foreign-made demolitions products, including Czech-supplied detonation cord. Affecting their actions were several considerations, including on-site evaluation that chemical weapons were not involved, the time constraints of the project (driven in part by command orders to conclude operations quickly and return home), and the limited supplies of explosives. In light of these, the engineers’ goal was not to completely destroy the rockets but to

“demilitarize” them, essentially breaking them apart and rendering them useless. This would not be the procedure used if the presence of chemical weapons had been suspected. In that case, total destruction by fire would have been the aim and a more elaborate process, using appropriately experienced personnel, would have been employed.

March 10, 1991—The 37th and the 307th completed the preparation of the pit and of the remaining bunkers and warehouses to the north in the main depot. They primed the charges and then departed south toward Saudi Arabia. They were at least 20 km (12.4 miles) away from Khamisiyah when the depot and pit exploded. The main explosion also generated secondary, or sympathetic, explosions among nearby munitions, which sent shell fragments and intact projectiles to distances up to 10 km away from the facility, well beyond the buffer zone estimated by the engineers but still well out of range of any of the departing troops.¹³

March 12-13, 1991—Even after the two sites had been destroyed, there was no conclusive evidence at the time that chemical weapons had been involved. When U.S. soldiers visited the pit two days after the destruction of the rockets and stood amidst the debris, no chemical alarms sounded during their visit. Those soldiers reported no acute physical reactions that would normally be associated with an encounter with a nerve agent. However, information gathered later in the year by the United Nations Special Commission on Iraq (UNSCOM) and during UNSCOM’s subsequent inspections (detailed below) provide evidence that munitions filled with the nerve agents sarin and cyclosarin were, in fact, destroyed at Khamisiyah in March of 1991.

To independently evaluate whether the 122mm rockets destroyed by U.S. troops at Khamisiyah contained chemical warfare nerve agents, SIU investigators interviewed DOD, CIA, DIA and other intelligence community personnel about the type of munitions found at Khamisiyah. Information also was gathered about the general purity and shelf life of Iraqi chemical munitions, the condition of the munitions at Khamisiyah, how and when they were transported from Iraq to that site, and the circumstances under which detection alarm reports by coalition forces were made. Investigators also reviewed volumes of classified and unclassified materials on the topic of chemical weapons published by various government agencies. The most valuable information available to the SIU staff in reaching its findings on this issue was, however, that produced by UNSCOM in the course of its site inspections of Iraq over the past several years.

ARMY INSPECTOR GENERAL INVESTIGATION OF KHAMISIYAH

The Army Inspector General (IG) investigated the Khamisiyah demolition and on October 10, 1997, issued a report finding “no empirical evidence” that chemical munitions or agents were present during the demolition operation. The Army IG also found no “conclusive evidence that U.S. Army ground units either knew or suspected that they were destroying chemical munitions.”¹⁴ Further, the IG found “no conclusive evidence that supports or refutes the conclusions of the Intelligence community” as to whether there were chemical munitions at Khamisiyah.

The IG report also stated that if low level exposure of troops did occur at Khamisiyah, it “was not of immediate military significance” and “was less than that necessary to cause an onset of acute physical symptoms.”¹⁵ There are grounds to support the Army Inspector General’s findings that there does not appear to have been any direct evidence available at the time when the EOD teams were in the Khamisiyah pit indicating that chemical munitions were present. However, the IG’s report is derived only from contemporaneous accounts of the Khamisiyah demolition and does not, for reasons that are unclear, also take into consideration information that had been generated from UNSCOM inspection team investigations of the area. As described below, UNSCOM’s on-site investigations determined that sarin and cyclosarin in fact were present at Khamisiyah based on their on-site discovery in late 1991—some months after the demolition—of chemical-filled warheads and related debris.

UNSCOM CONCLUDES CHEMICAL WEAPONS WERE AT KHAMISIYAH

As part of a broad internationally-sanctioned discovery process, United Nations Special Commission inspection teams visited Khamisiyah at least five times between October 1991 and August 1997. Their findings are summarized below:

1991—At the first inspection in October of 1991, UNSCOM found rockets at the Khamisiyah pit and determined that they contained a mixture of sarin and cyclosarin. UNSCOM inspectors tested at least one chemical rocket at that time and also noted the presence of over 300 more leaking and damaged rockets. According to UNSCOM, the chemical potency of the liquid in the warhead was so degraded it was necessary to place a sensitive detection device called a Chemical Agent Monitor just inches away from a leaking 122mm rocket in order to register a positive reading for the chemical agent sarin.

1992—UNSCOM inspectors discovered many rockets along the pit’s south wall (sometimes described as a berm, or earthen retaining wall) that had been bulldozed by the Iraqis some time after the previous inspection.

1993—UNSCOM inspectors shipped about 500 rockets from Khamisiyah to a destruction facility at Al Muthanna, where they were drained of sarin/cyclosarin and then demilitarized.

1996—In May of 1996, UNSCOM found plastic burster tubes, which are components of munitions containing chemical agent, and other evidence that chemical rockets had been in a main depot bunker that was destroyed by U.S. forces on March 4, 1991, a week before the pit explosion.

1997—In August of 1997, another inspection of the bunker discovered in 1996 revealed that more sarin-filled rockets remain buried underground at that site.

UNSCOM RATES IRAQ CW SARIN PURITY AS HIGH AS 75 PERCENT

Based on Iraqi production documents found by UNSCOM during an inspection of the Al Muthanna chemical weapons production and storage facility in Iraq, the purity of Iraqi sarin produced during the Gulf War ranged from 40 percent to 75 percent. During their follow-on investigations in Iraq, UNSCOM teams found and tested a number of 122mm rockets found at the Khamisiyah pit. Determining the chemical's purity several months or years after the Khamisiyah event provides clues as to the potential lethality of the weapons at the time of destruction. Many factors, including temperature, humidity, type and size of container, and storage procedures, can affect the quality of a chemical agent. Based on available evidence, the SIU investigators could not draw specific conclusions about the potential lethality of any of the chemical-filled rockets discovered at Khamisiyah. However, according to UNSCOM, the purity of the sarin/cyclosarin mixture in the 122mm rockets found at Khamisiyah that were filled in December of 1990 was about 60 percent. Iraqi chemical production records recovered by UNSCOM indicate that this chemical agent was part of a production run of about 60 tons of sarin/cyclosarin that was placed into over 8,000 122mm shells. UNSCOM's officials estimated the purity of the agent at the time of the demolition of Khamisiyah was about 50 percent.¹⁶

UNSCOM authorities found that Iraq shipped, either by rail or truck, 2,160 122mm rockets to Khamisiyah in early January of 1991 and stored half of them in a bunker that subsequently was destroyed on March 4 by U.S. troops. Sometime between January 10 and January 15, the other half of that cache was moved to the pit area.¹⁷ The Iraqis have provided two explanations for the movement of these munitions to Khamisiyah: (1) they were moved for safety reasons because the rockets were leaking and (2) they were moved to avoid being destroyed by bombing during the Gulf War itself.¹⁸ UNSCOM personnel also told SIU staff that the Iraqis have recently declared that the rockets were initially stored in two bunkers.¹⁹ However, UNSCOM inspectors have not been able to find another bunker at Khamisiyah that confirms this.

UNSCOM also learned that in January of 1991 Iraq moved over 6,000 mustard-filled 155mm-artillery shells to the An Nasiriyah ammunition storage area, located approximately 30km northwest of Khamisiyah. They were part of a group of 13,500 projectiles that were filled with mustard in 1990, with a purity that ranged from 85 to 90 percent. U.S. intelligence sources stated that sometime in January or February the munitions were transferred to an area outside of Khamisiyah and covered to avoid overhead detection. However, these munitions were neither found nor destroyed by U.S. personnel in the area. The Iraqis showed members of the October 1991 UNSCOM inspection team these mustard-filled shells. All of the shells were eventually transferred by UNSCOM to Al Muthanna for destruction.

Much, if not all, of the controversy that has surrounded the demolition of Khamisiyah likely could have been avoided had the Department of Defense and the intelligence community thoroughly investigated the information available about it in 1991. The following chronology, derived from

unclassified documents and government publications, details information available inside the U.S. government about Khamisiyah in 1991:

April 1991—The U.S. government intercepted an Iraqi report claiming U.S. forces had destroyed the Khamisiyah depot on April 1 and 2. The Iraqi information was incorrect; the report referred to the destruction of the 37 bunkers in the main Khamisiyah depot on March 4, 1991.

May 16, 1991—Iraq declared to the United Nations that 2,160 sarin-filled rockets had been destroyed at “Khamisiyah stores” and 6,240 mustard-filled 155mm-artillery shells remained intact at “Khamisiyah stores.”

May 17, 1991—Iraq gave the location of “Khamisiyah stores (Nasiriyah)” at 3046N/04630E, which is near Khamisiyah. This declaration was widely distributed inside the State Department, the Department of Defense, and the intelligence community.²⁰

August 1991—The CIA published a highly classified intelligence assessment on Iraqi noncompliance with UN Security Council resolutions that listed Khamisiyah as a known CW storage site.²¹

October 1991—The UNSCOM inspection team was led by Iraqis to a number of 122mm Iraqi sarin/cyclosarin rockets in a pit near Khamisiyah and over 6,000 155mm mustard rounds in an open area west of Khamisiyah. These were the same shells that had been initially transported to An Nasiriyah in January 1991. The Iraqis also told the inspectors that coalition troops had destroyed chemical weapons in a bunker at Khamisiyah earlier that year.

November 1991—The UNSCOM report was made available to the DIA, but it was dismissed as containing Iraqi deception for two reasons: (1) confusion over whether or not the inspectors were actually taken to Khamisiyah or the depot nearby at An Nasiriyah and (2) a belief that the Iraqis may have placed the chemical weapons there as part of an effort to conceal their chemical and biological weapons programs.²²

The Arms Control Intelligence Staff (ACIS), which was the intelligence community’s interagency coordinating organization at the time, disseminated a report throughout the intelligence community and the Department of Defense that included Iraqi claims about the destruction of Khamisiyah. That same month, ACIS distributed an internal CIA cable that described the demolition, identified Khamisiyah as being the same site as one known within the intelligence community during the Gulf War as Tall Al Lahm, and reported that Army Central Command had provided information placing the 24th Mechanized Infantry Division near Tall Al Lahm. Remnants of U.S.-manufactured and deployed M-48 shaped charges had been recovered at the site, indicating that American forces had been present during the destruction. ACIS sent a message to the 24th Mechanized Division advising them about Khamisiyah and asking if their troops were involved in the demolition. The 24th

Mechanized Division did not respond to the message, although it is unclear why, and ACIS failed to follow-up.²³

MISIDENTIFICATION OF KHAMISIYAH SITE KEY TO INTELLIGENCE CONFUSION

The fact that the area now referred to as Khamisiyah had been commonly identified within the intelligence community as Tall al Lahm appears to have been a key factor hindering timely dissemination and use of intelligence information about the area. Tall al Lahm refers to another town just west of the ammunition storage area. The Iraqis referred to the area as Khamisiyah, a somewhat larger town east of the facility. To the 37th Engineer Battalion, it was known as Objective Gold. However, the National Security Agency database referred to the area as Al Khamisiyah.

The lack of coordination of names and data bases concerning Khamisiyah led to confusion about who destroyed the depot, whether or not it was a chemical weapons site and if the site was truly Khamisiyah or An Nasiriyah. The Central Intelligence Agency has acknowledged these shortcomings and has made a number of recommendations regarding shared use of a primary database for location names and spellings, development of which should be a priority to help avoid similar mistakes in the future.²⁴

EXTERNAL PRESSURES PROMPTED U.S. GOVERNMENT INVESTIGATION INTO KHAMISIYAH

The information about the events at Khamisiyah described above only recently came to light because of pressure from veterans, Congressional investigations, the media, and others. The following chronology describes actions taken by the U.S. government as a result of that pressure:

March 1995—The CIA was directed to conduct a thorough review of intelligence during the Gulf War.

May 25, 1995—The Presidential Advisory Committee on Gulf War Veterans' Illnesses (PAC) was established.

September 1995—The CIA reported to the DOD Persian Gulf Investigation Team (PGIT) that the Khamisiyah demolition was a possible chemical release event. The report was based on a review of the 1991 UNSCOM report on Khamisiyah and the development of a comprehensive summary of Iraqi chemical weapon production and storage facilities. A search was made of the newly-constructed DOD Environmental Support Group (ESG) unit locator database to find units that were located in and around Khamisiyah in early March 1991.

October 1995—The PGIT reported that the ESG unit locator database search revealed that the 37th Engineer Battalion had reported its location in March 1991 at coordinates near Khamisiyah.

However, the PGIT was unaware that the mission of the 37th Engineer Battalion had been to search out and destroy weapons stockpiles and did not conduct a follow-up investigation.²⁵

January 1996—Khamisiyah was mentioned by the CIA as a possible chemical weapons storage and release site during a briefing to the National Security Council staff. The National Security Council staff directed that CIA and the Department of Defense work together to pursue this issue aggressively. Further information linking U.S. military personnel to the destruction of chemical weapons was uncovered, including imagery that revealed bunkers at Khamisiyah had been destroyed between March 1 and March 8, 1991 and cables indicating that UNSCOM inspectors found evidence of U.S. demolition charges at Khamisiyah.

March 10, 1996—A definitive connection was made five years to the day after the Khamisiyah “pit” demolition when a CIA analyst heard a tape recording of a radio show during which a veteran who had been with the 37th Engineer Battalion at Khamisiyah described the demolition of an Iraqi facility.²⁶

March 19, 1996—CIA and DOD officials met with UNSCOM personnel to discuss Gulf War illnesses issues. At the meeting UNSCOM mentioned its intent to revisit Khamisiyah. UNSCOM reinspected Khamisiyah in May 1996 and found high-density polyethylene inserts, burster tubes and fill plugs which are used in chemical weapons and whose presence suggested that chemical rockets were destroyed when the bunker was exploded on March 4, 1991.²⁷

June 21, 1996—After five years of insisting that no chemical weapons had been deployed by Iraq during the Gulf War, DOD publicly announced that in fact chemical weapons had been present at least at Khamisiyah and that it was a site that had been destroyed by U.S. troops.

September 25, 1996—A joint hearing of the Senate Committee on Veterans Affairs and the Senate Select Committee on Intelligence on the Khamisiyah incident was held.

November 1996—The Secretary of Defense created the Office of the Special Assistant for Gulf War Illnesses (OSAGWI).

INTELLIGENCE OPERATIONS SCRUTINIZED

In order to determine the adequacy of the intelligence provided to the troops at Khamisiyah, it was necessary first to investigate how intelligence was provided to our troops during the Gulf War. Before the Gulf War deployment in 1990, approximately 200 people, including DIA and contractor support, staffed the J-2 Intelligence Directorate at CENTCOM headquarters at McDill Air Force Base in Tampa, Florida. Beginning in April 1990 there was increasing concern about activities in Iraq and by July, the J-2 believed that Iraq was on the verge of invading Kuwait.²⁸ At CIA, the National Intelligence Officer for Warning also reported that Iraq was likely to invade Kuwait.

INTELLIGENCE OPERATIONS WERE NOT FULLY INTEGRATED AND COORDINATED

Within days of the August 2, 1990 Iraqi invasion of Kuwait, a National Joint Intelligence Center (NJIC) was established in the Pentagon to coordinate intelligence operations between CENTCOM and the intelligence community in Washington. The NJIC operation included representatives from the Joint Chiefs of Staff, National Security Agency, Defense Intelligence Agency, and imagery and other intelligence community collection entities, but the Central Intelligence Agency initially refused a desk at NJIC. Later, the CIA became part of the team, but continued to operate separately from its headquarters in Langley, Virginia, instead of with NJIC at the Pentagon.

CIA, JOINT INTELLIGENCE LIAISON ELEMENT NOT PLUGGED-IN TO ALL INTELLIGENCE OPERATIONS

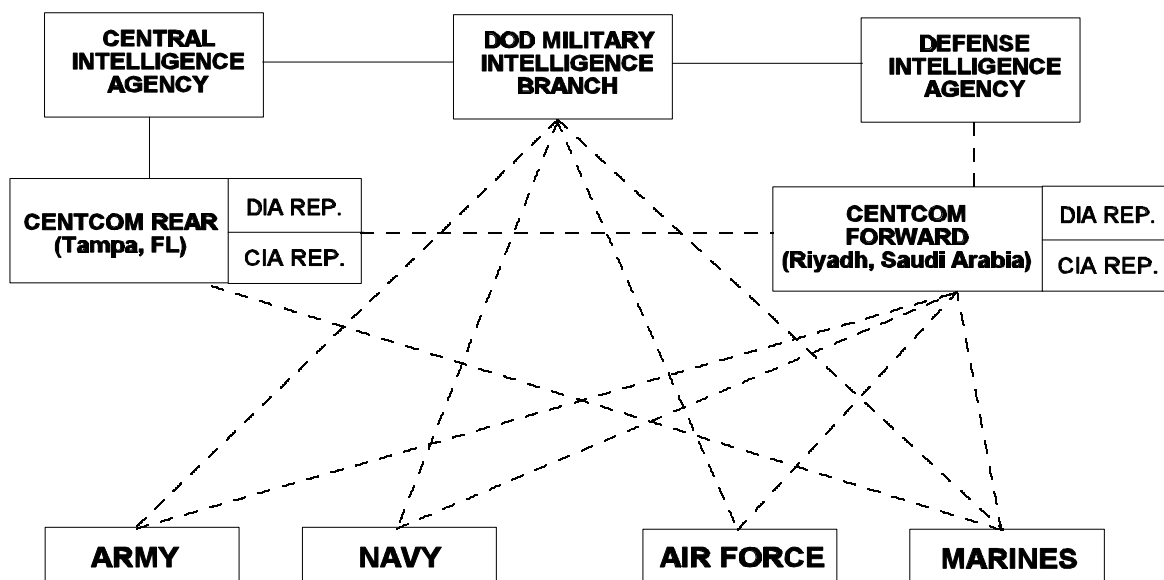
This lack of coordination of intelligence assets also occurred in the Gulf. The CENTCOM Joint Intelligence Center (JIC) in Riyadh, Saudi Arabia consisted of a variety of subgroups, including Operations, Targeting/Bomb Damage Assessment, Collections, DIA, and CIA. However, CIA intelligence personnel also operated out of a Joint Intelligence Liaison Element (JILE) in Riyadh. Further, the CIA senior representative to CENTCOM never went to the Gulf. Instead, the JILE chief became the senior representative from the CIA. The JILE representative was rotated into and out of the Gulf every thirty days, affecting information continuity. All these circumstances adversely affected the CIA's relationship with intelligence operatives at headquarters in Riyadh.²⁹ To further complicate intelligence coordination, military operations support also came in the form of eleven National Military Intelligence Support Teams (NMIST) comprised of intelligence officers from the various commands supporting CENTCOM.³⁰ Thus, the quality of intelligence coordination and effectiveness between the J-2 and the services depended on the services' input and the ability of the particular military personnel assigned to the J-2.³¹ The result was that the J-2 should have been the focal point for intelligence information, but was not. (See diagram at Figure 1.)

JOINT AGENCY EFFORTS BEGIN TO RESURRECT GULF WAR INTELLIGENCE

Since the Pentagon announcement in June of 1996 that U.S. military personnel may have been exposed to chemical warfare agents as a result of the Khamisiyah demolition, the CIA Persian Gulf Illness Task Force, OSAGWI, the Army Inspector General, the CIA Inspector General, and DOD's Office of Intelligence Oversight all have been tasked to retrieve and reconstruct the intelligence available about Khamisiyah to the 37th Engineer Battalion at the time of the demolition. As part of this effort, the CIA and DIA have declassified numerous previously highly classified documents about Khamisiyah.

From these efforts, it appears that intelligence support for this incident fell into three categories: (1) intelligence about Khamisiyah as a potential chemical weapons site; (2) intelligence community

Figure 1. Intelligence Operations Lines of Communication During the Gulf War



assessments about the types of Iraqi bunkers that were likely to house CW; and (3) intelligence about the manner in which Iraq marked its chemical weapons. CIA's Khamisiyah: A Historical Perspective on Related Intelligence, published in April of 1997, provides an exhaustive reconstruction of intelligence available during the Gulf War. In his introductory note to the paper Director of Central Intelligence George J. Tenet stated:

"This paper . . . illustrate[s] that intelligence support associated with Operations Desert Shield and Desert Storm—particularly in the areas of information distribution and analysis—should have been better. Key issues include problems with multiple databases; limited sharing of "sensitive" but vital information; and incomplete searches of files while preparing lists of known suspect CW facilities."³²

The Army Inspector General was more critical, stating:

"The [personnel] directly involved in the destruction of the Khamisiyah Ammunition Supply Facility in March 1991 did not have all the information available about the facility. Although it is impossible to determine if possession of this additional information would have had an impact on the course of events, the fact remains that information suggesting the facility might house chemical munitions was available at high levels of command."³³

Based on the evidence described here, the SIU finds that the decision-making process and organizational structure of the intelligence elements in DOD and the CIA lacked coordination and effectiveness. For example, in May 1986, intelligence sources indicated that chemical weapons were moved to Khamisiyah during the Iran-Iraq war. Shortly thereafter, a November 1986 CIA intelligence assessment concluded that chemical weapons were stored during the Iran-Iraq war “at the southern forward ammunition depot located at Tall al Lahm.”³⁴ However, this estimate also reported on “a new generation” of bunkers, subsequently dubbed “S-shaped” bunkers because of their unusual shape, that were deemed by analysts to most likely serve as storage sites for Iraqi CW. The bias toward S-shaped bunkers by the intelligence community led analysts to keep Khamisiyah off CW facility lists before the Gulf War because it had no S-shaped bunkers.

The intelligence community concluded in 1991 that Iraqi reporting about Khamisiyah actually referred to An Nasiriyah because it did house such a bunker.³⁵ Good analysis would have included a search of all intelligence reporting and products, including historical references. The information that Khamisiyah was a warehouse for Iraqi CW during the Iran-Iraq war should have been sufficient evidence to highlight it as a potential CW site.

MITRE REPORT

In the fall of 1996, the Assistant to the Secretary of Defense (Intelligence Oversight) (ATSD (IO)) was charged by the Deputy Secretary of Defense to provide an independent analysis of what intelligence information was available to DOD during the Gulf War about Khamisiyah and other potential CW incidents and then determine what was done with the information. The ATSD (IO) contracted with the MITRE corporation in December 1996 to produce the study with the expectation that a final product would be completed by May 31, 1997. The delivery date was subsequently extended to late 1997 and as of May 1998, the report had yet to be completed.

The SIU's staff monitored the progress of the ATSD (IO)'s investigation. After initial difficulties in obtaining access to the report, SIU investigators were allowed to read an incomplete version of the still highly-classified study. The SIU's investigators found the version of the report that it read to be a well-researched product, with sound findings and conclusions, particularly in discussing intelligence related topics. It would be helpful in shedding light on this issue if the Secretary of Defense in the near future releases the report in an unclassified, not just classified, form.

DOD/OSAGWI-CIA ATTEMPTS TO RECONSTRUCT KHAMISIYAH

BACKGROUND

Once DOD and CIA acknowledged the likelihood that chemical agents were present in some Iraqi weapons destroyed by U.S. forces, questions remained as to whether American personnel were actually exposed to any agent that might have been released during that destruction. DOD, through the Office of the Special Assistant for Gulf War Illnesses, and the CIA jointly produced and distributed a “plume” analysis of the March 10, 1991 pit demolition that represented what OSAGWI officials call “the worst case scenario” to try to determine whether any troops might have been exposed to some level of chemical agent and what level of exposure might have occurred.

What DOD and CIA label as a “plume,” and what this report will also refer to by that term, is not a cloud of material that was ever actually observed at the time or can be definitively shown to have existed. It is a mathematically derived computer model used to produce a theory of what may have occurred when the chemical-filled rockets were destroyed at Khamisiyah. It should not be confused with the large clouds of smoke and debris rising above the large Khamisiyah munitions depot and the smaller rocket-filled pit when the various explosive charges were detonated as reported in numerous anecdotal eyewitness reports. From all accounts, the visual effect was dramatic, even from a distance of 10-15 km. The main depot, a complex several square kilometers in size, went up in spectacular fashion, with smoke rising high enough to be described as covering a good portion of the sky.³⁶ Eyewitness accounts of the smaller pit explosion—timed to begin in synch with the main depot’s destruction—describe a significant cloud rising over the site, with rockets “cooking off” and flying out of the pit as their motors ignited from the concussions and heat of the explosive charges set on other rockets.

For the most part, these reports describe the short-term effects of the demolition process viewed from a distance. However, they do not accurately describe what could have happened to any chemical warfare agents released by the demolition. The Khamisiyah plume should also not be compared to the smoke plumes associated with the oil well fires. Those were the visible, well-documented, and long-lasting effects of Iraqi sabotage. In contrast, there were no on-site, immediate, and accurate measurements of releases from the Khamisiyah pit detonation. The absence of such data makes it necessary to rely on reconstructed weather and other data collected at the time to produce a theory as to what may have occurred when the chemical-filled rockets were destroyed.

The DOD/CIA modelers found, and the SIU’s investigators concur, that as a result of the detonation some portion of the chemicals would have been instantly burned and vaporized. Some amount would have been aerosolized and sprayed into the atmosphere. Some of the sarin/cyclosarin would simply spill out on the ground and would be absorbed either into the ground or the debris from the explosion. That portion of the chemicals released into the atmosphere by the force of the explosion would become subject to the dynamics of wind and other meteorological conditions

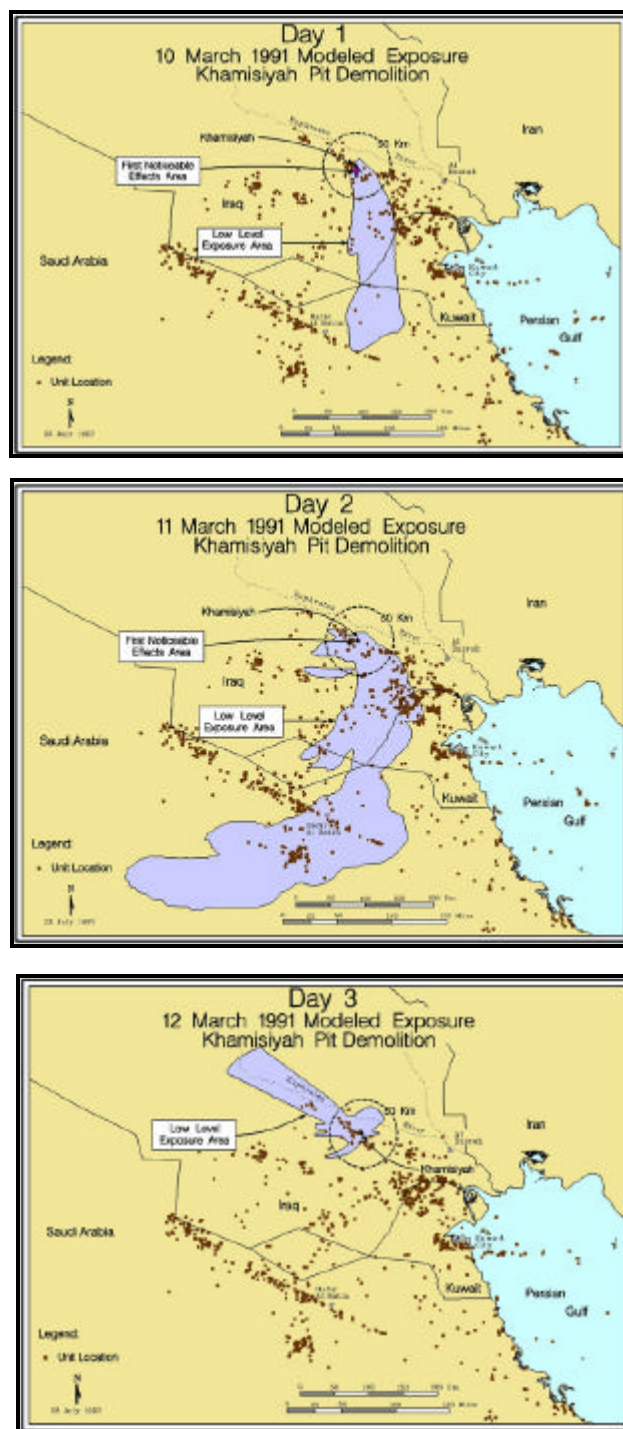
prevailing in the region. Rainstorms which were recorded as passing across the air mass bearing the airborne chemicals would have diluted that vapor cloud; cooler night air would have brought the plume closer to the ground, while warming morning air would add buoyancy to the plume and drive it back up into the atmosphere. Atmospheric pressure, variations in humidity and dew point, moisture on the ground, even heat and light reflections from sand and rocks, would influence not just the path of the plume. They would also affect chemical changes occurring within the plume. In particular, sarin is a substance that although initially lethal is unstable and degrades rapidly once exposed to the open air.

Four contractors and a team of CIA-sponsored scientists experienced in plume analysis developed and presented five separate plume results based on generally accepted transport and diffusion models.³⁷ The models were created with only the simplest of detonation and chemical source assumptions and somewhat limited historical meteorological data depicting generalized atmospheric conditions for the March 10-12, 1991 period of the detonation. The various diagrams and depictions of the Khamisiyah plume model that were produced are wholly computer-generated images that were never confirmed by on-site, real-time observations. This computer model analysis was made public on July 22, 1997, in time for the Presidential Advisory Committee on Gulf War Veterans' Illnesses (PAC) to include the results in its report released in October of that year. (This model is reproduced at Appendix B.)

“SUPER PLUME” OF ALL FIVE MODELS DEVELOPED TO SHOW “WORST CASE SCENARIO”

In the published analysis, the results from all five plume models were overlapped and the outermost perimeter of the resulting “super plume” was used to mark the maximum possible boundary of chemical exposure potential. (See Figure 2.) This “union” model was selected over one that showed the “intersection” of the five plumes, which would be a region smaller than that of the union model but include an area common to all five plume models. The resulting area indicated by the “super plume” was compared to unit locations supplied by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Based on this information, assumptions were made as to which troops were located in the area indicated by the “super plume” model during the three-day period after the Khamisiyah demolition and who might have potentially come into some contact at any level with chemical agent. In turn, letters were sent by OSAGWI to at least 100,000 Gulf War veterans advising them of a potential for a low-level exposure to chemical weapons agents released during the destruction of the Khamisiyah pit area. (See copy of letter at Appendix C.) The language contained in the OSAGWI letter to veterans was noncommittal, only suggesting that low level exposure of those who received it was a possibility but making no more definite statements than that.

Figure 2. Modeled Exposure of the Khamisiyah Pit Demolition



Nothing in the DOD/CIA plume analysis supports a conclusion that any members of the U.S. armed forces serving in the Gulf War theater at the time of the depot demolition were exposed to levels of chemical warfare agents sufficient to trigger the onset of acute symptoms. This is consistent with the available evidence from the event and its aftermath and the physical condition of those in the vicinity, none of whom are reported to have developed acute effects. The SIU found, however, that there appear to be numerous flaws in the methodology used that also make it questionable to rely on the July 1997 DOD/CIA plume model analysis in drawing firm conclusions about the scope of possible low-level exposures from the Khamisiyah pit demolition. The SIU finds that the available data, as used in this model, is insufficient to state with certainty that any member of the U.S. armed forces was exposed to low levels of chemical weapon agents or that if exposed, whether that exposure was at a level sufficient to cause adverse health effects now or in the future. This nevertheless leaves open the possibility that in the future, medical science and long-term research may identify new evidence that could support a different conclusion, and research efforts in this area should continue.

The SIU's investigators, with the assistance of a consultant with expertise in the physics of plume modeling, independently analyzed the assumptions and methodology on which the DOD/CIA plume modeling effort was based and the circumstances under which it was produced. In reviewing the DOD/CIA plume model, SIU investigators also consulted extensively with experts in plume transport and diffusion models who were equipped with several atmospheric and meteorological data sets reflecting conditions in the vicinity of the Khamisiyah pit on March 10, 1991. As a result, the SIU does not believe that the DOD/CIA scientists used available on-site information or supportable assumptions sufficient to adequately recreate the pit demolition. Instead, these assumptions produced model results that likely overestimated by a considerable degree the probable area in which sarin and cyclosarin that may have been released by the Khamisiyah demolition could have been dispersed. From this review, the SIU concludes that the results of the DOD/CIA analysis were published in July of 1997 before the study was complete, accurate, and scientifically sound. In doing so, and in its reluctance to express concerns about the scientific soundness of the product as it existed at that time, it appears that the government may have ended up doing more to confuse and alarm Gulf War veterans, both those healthy and ill, than to help them.

QUESTIONABLE METHODOLOGY WAS USED IN DEVELOPING THE "SUPER PLUME" MODEL

There are numerous inconsistencies and information gaps in the methodology on which the DOD/CIA plume analysis is based. Several examples arose just from a Khamisiyah pit demolition experiment conducted by DOD at Dugway, Utah on May 28, 1997:

1. The pit itself was not accurately reconstructed. A wall (or "berm") of the pit that closely bordered the stacks of 122mm rockets at Khamisiyah likely would have deflected or absorbed part of the explosive forces created when the 37th Engineer Battalion detonated the explosives placed on those rockets. It is also likely that the wall would have absorbed a portion of the chemicals ejected

by the explosions. That wall was not recreated, although the materials and manpower to do so were available at Dugway.

2. The test demolition occurred on a flat test range, circumstances that did not replicate the pit's particular micro-atmospheric conditions. Equipment used to capture droplets of simulated agent was positioned close to the detonation and there was no attempt to track the plume more than several hundred yards downrange. By January 1998, some six months after the plume analysis was made public, DOD/CIA plume modelers acknowledged this data deficiency and were in the process of adding the micro-meteorological information to a new plume analysis.

3. Accounts from Explosive Ordnance Disposal personnel at Khamisiyah depicted a random, almost haphazard technique for placing C-4 explosives in the rocket stacks and the use of detonation cord to augment the C-4 explosives that were available. According to those accounts, some charges were placed on rocket motors, some on warheads, and some just on top of the stacks. Dugway personnel did not appear to have attempted to replicate the irregular pattern actually used at Khamisiyah, choosing instead to apply charges in a methodical fashion to a stack of 25 custom built replicas of Iraqi 122mm rockets. Earlier in the testing phase, Dugway personnel detonated individual rockets and then smaller stacks of rockets in order to establish some parameters for the final test. In addition, and with no explanation given, test personnel placed several concrete-filled rocket cases throughout the stack. No rationale for the presence of these concrete dummy rockets has ever been given despite several requests by SIU investigators for an explanation. It would seem that a well-designed test explosion would attempt to replicate the actual event as closely as possible so as to develop the most sound model. However, from the SIU investigators' on-site observations, the experiment as it was set up omitted or changed key elements of what is known about the physical makeup of the Khamisiyah pit and the way in which it was destroyed. These changes make it questionable that the results of the Dugway test accurately replicated the Khamisiyah detonations or provided data on which reliable models can now be based.

4. Concurrent with the Khamisiyah pit demolition on March 10, 1991, Army EOD teams were demolishing a larger bunker area approximately 3 km north, and upwind, of the pit. SIU investigators questioned DOD/CIA and Dugway scientists about possible effects on the Khamisiyah plume from material ejected into the atmosphere from the larger explosion. Those individuals at the time discounted any effect from that explosion on a plume from the Khamisiyah explosion. However, by December of 1997, they had reconsidered this position and by January of 1998, DOD/CIA modelers were in the process of revising their assumption data to take possible effects from this second explosion into account in constructing a new model.

Meanwhile, the Pentagon over a period of months increased its estimates of the numbers of troops potentially exposed to chemical agents released during the Khamisiyah demolition. In 1996, Defense Department officials publicly took the position that no U.S. troops were exposed to any level of chemical weapons agent. By early 1997, the Pentagon had revised its position to state that 20,000

personnel were possibly exposed. In the July 1997 analysis based on computer modeling of the Khamisiyah event, the number again was revised upward to possibly involve approximately 100,000 troops exposed to some level of chemical weapons agent. By early 1998, DOD analysts were suggesting that the number could rise beyond 110,000 in the group of those potentially exposed to some level of chemical weapons agent. None of these estimates of troop numbers include any estimate of the level of exposure that might have occurred.

In addition to the flaws in the modeling process described above, also of concern is the fact that the DOD/CIA report on the plume model was not subjected to a rigorous peer review prior to its release, especially given the highly public profile attached to the finished product. No attempt to undertake a peer-review process for the modeling analysis was done until late in the fall of 1997, well after the report had been publicly released as a final product, and that process consisted of a single session lasting less than two days. Had outside experts from the academic and scientific community been a part of the model's development on an ongoing basis, they could have provided some perspective on and reviewed the efforts being undertaken by the government contractors who performed the modeling. Their input could have avoided some of the defects that the SIU investigators identified in the modeling process. At a minimum, the lack of rigorous peer review may have contributed to the fact that the model's limitations at the time of its public release were not also made clear.

Based on all the available evidence, the SIU finds that the theoretical model of the Khamisiyah demolition presented in July 1997 by DOD and the CIA was fundamentally flawed. The final product lacked adequate peer-review and the report's worst-case scenario assumptions were not supported by direct evidence. The Office of the Special Assistant for Gulf War Illnesses confirmed in an April 1998 response to questions from the SIU that more time for analysis of the Khamisiyah incident would have been preferable, but that "we had an obligation to make our findings public . . . to reduce the uncertainty many veterans were feeling."³⁸ The result, however, was that the Department of Defense appears to have overstated the number of personnel potentially exposed to low-levels of chemical agents following the Khamisiyah pit demolition. And, it did so without effectively communicating the model's hypothetical nature. Moreover, although the July 1997 DOD-CIA model was the basis for notifying almost 100,000 veterans of a potential exposure, on-going modeling has already caused the DOD and the CIA to redraw the original model's boundaries and makes even that theory subject to change in the future.

AFTAC, A KEY MODELING RESOURCE, NOT INCLUDED IN MODELING PROCESS

In reviewing the modeling effort, SIU investigators contacted U.S. Air Force Global Weather Central and the Air Force Combat Climatology Center seeking more information on the weather conditions that prevailed at Khamisiyah on March 10, 1991. They, in turn, directed SIU investigators to the Air Force Technical Assistance Center (AFTAC) to obtain the most accurate USAF weather data for the time period in question. Based at Patrick Air Force Base in Florida, AFTAC has been the

Defense Department's lead office for meteorological analysis of the effects of nuclear and other high-yield explosive devices for more than fifty years. AFTAC also keeps historical global weather data and works in conjunction with the National Center for Atmospheric Research in Boulder, Colorado to provide such data to other federal and international agencies. While not known exclusively as a plume-modeling agency for Khamisiyah-like detonations, AFTAC nonetheless is well regarded among modeling agencies employed by DOD as a source of sound atmospheric modeling techniques.

AFTAC RECREATED KHAMISIYAH METEOROLOGY

At the SIU's request, AFTAC produced in May of 1997 a basic wind and weather analysis of the 100 square mile area centered on Khamisiyah for the dates March 1-12, 1991. This report depicted winds and weather from the earth's surface up to 18,000 feet, and included cloud cover and precipitation reports for the first twelve days of March 1991. As a complement to the weather depiction, AFTAC analysts prepared a simple plume diffusion model ("simple" in that the analysts only modeled the movement of the air mass surrounding Khamisiyah and did not factor in nerve agent chemistry) using the Khamisiyah pit's geographic coordinates to define the plume source. This first AFTAC-produced model indicated a plume track that moved south and then east over portions of northern Saudi Arabia, Kuwait, and the Persian Gulf. This first AFTAC model showed a plume that purportedly would have covered an area that included Navy personnel located on ships in the Persian Gulf and citizens of Kuwait City on the coast. (See AFTAC plume chart at Figure 3.) AFTAC next produced a comprehensive plume model adding sarin source information, which was provided to the SIU in December of 1997. The comprehensive AFTAC model depicts a plume with some of the short-range (within fifty miles) overlapping aspects of the DOD/CIA plume, but covering a much smaller geographic area in which low-level chemical exposure may have occurred. This area also extends further into Kuwait than is the case with the DOD/CIA "super plume."

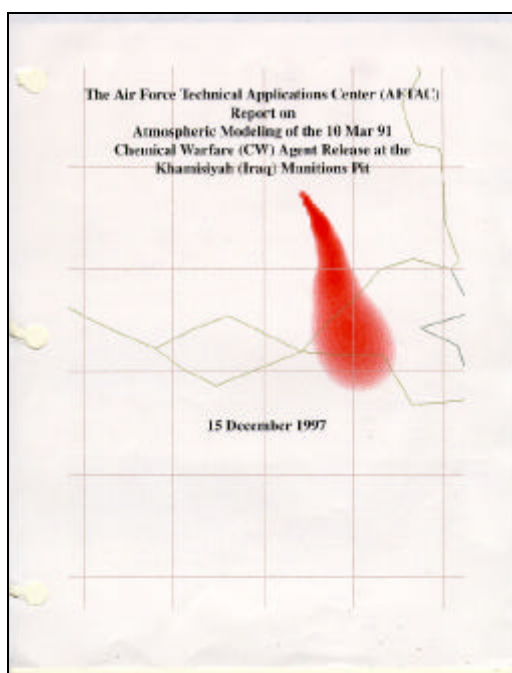
AFTAC MODEL DIFFERS FROM OSAGWI/CIA RESULTS

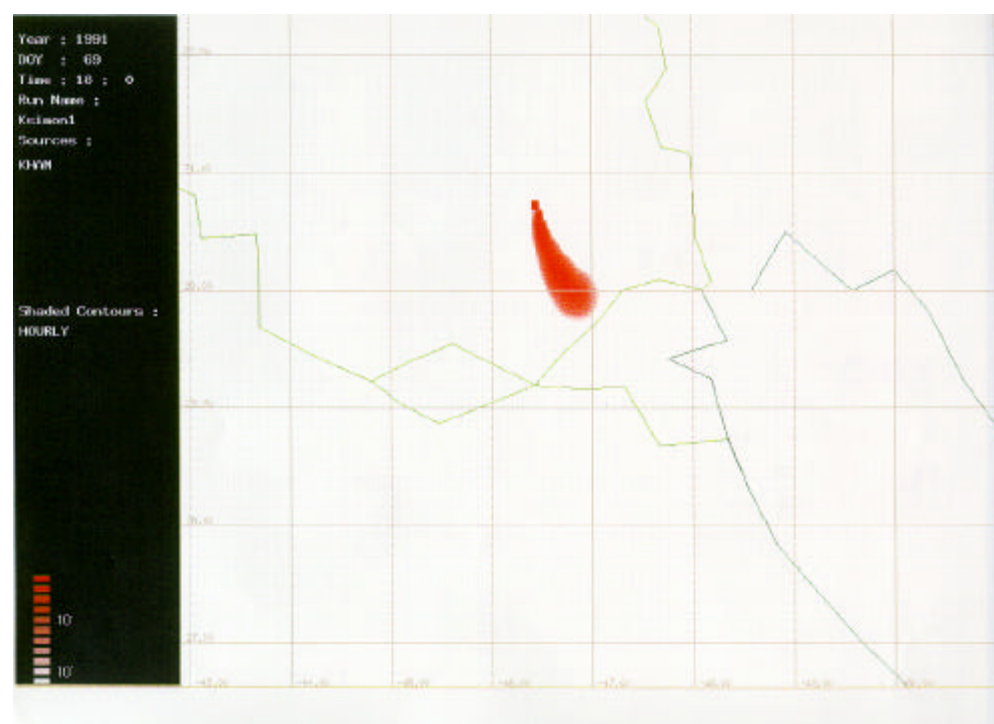
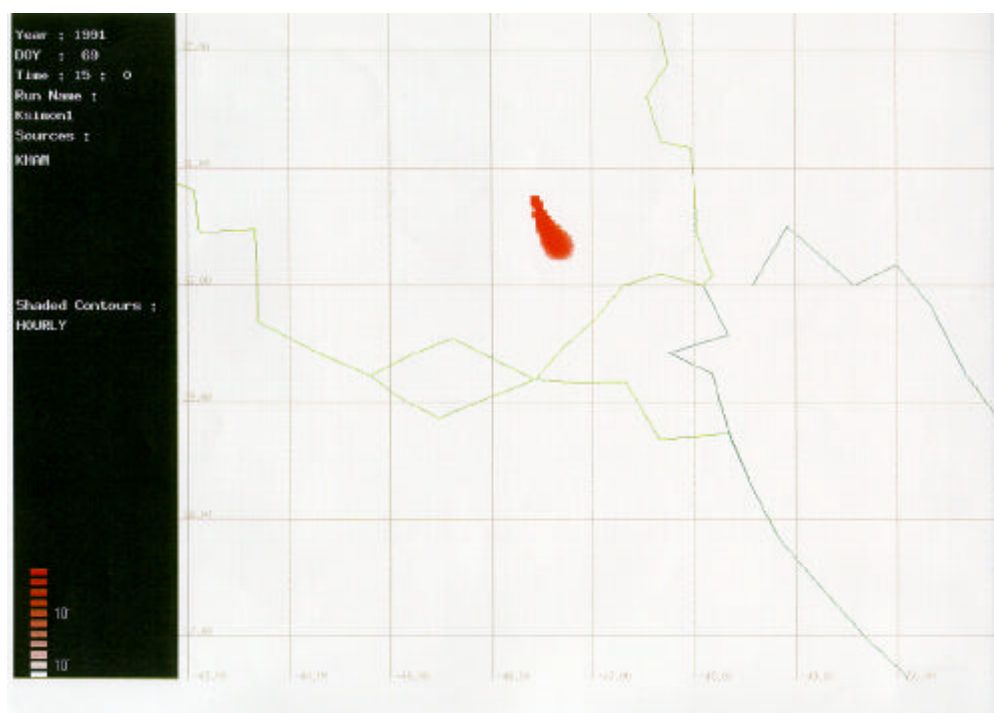
A physics expert retained as a consultant to the SIU produced at the SIU's request a report, reproduced at Appendix D, analyzing the DOD/CIA and the AFTAC modeling efforts. This report expresses a high degree of confidence in the methodology and data development used by AFTAC. The AFTAC analysis does not draw any conclusions about the number of people potentially exposed or levels of exposure anyone might have experienced. As noted above, both AFTAC plume models appear to overlie a number of unit locations not included under the DOD/CIA plume model. It is important once again to emphasize that at the time of the Khamisiyah demolition no personnel—whether they were close to the explosion or at the distance indicated at the extreme outskirts of the DOD/CIA-modeled plume—reported experiencing any acute symptoms indicating exposure to a chemical warfare agent.³⁹

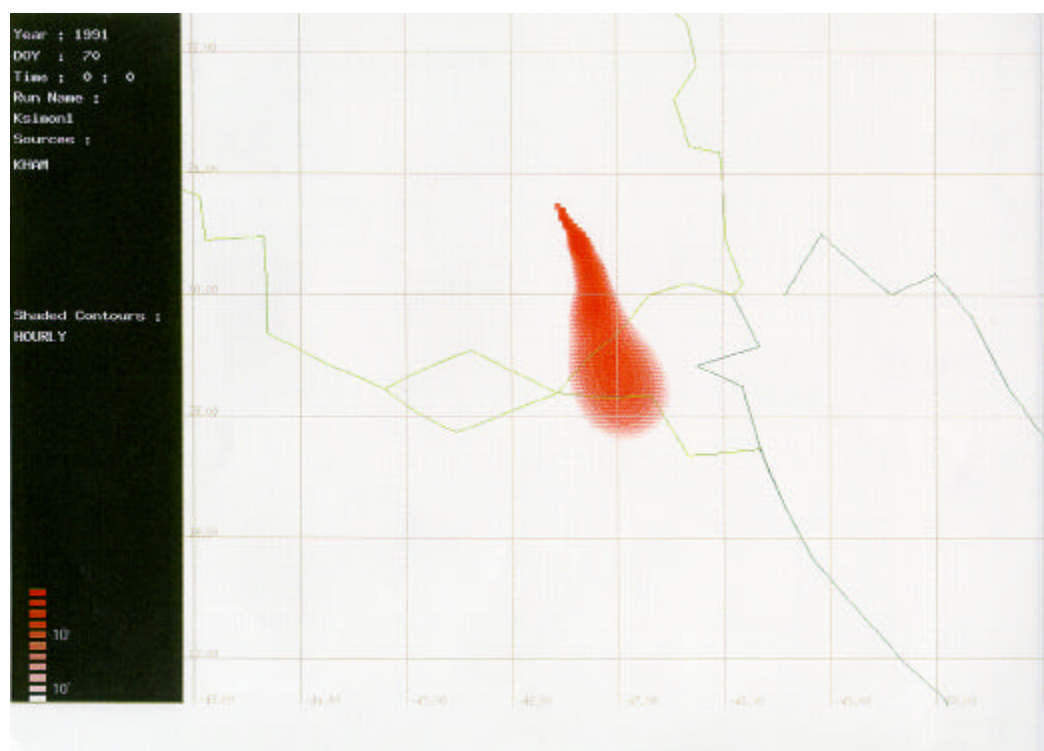
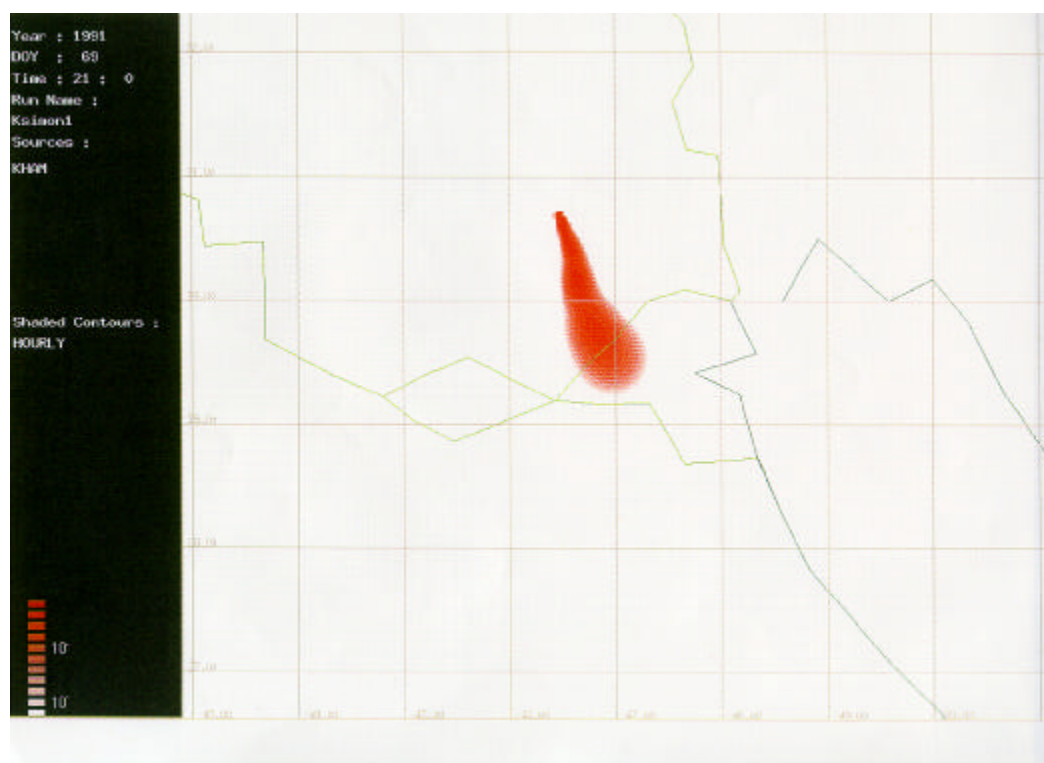
LESSONS LEARNED FROM THE KHAMISIYAH MODELING EFFORT

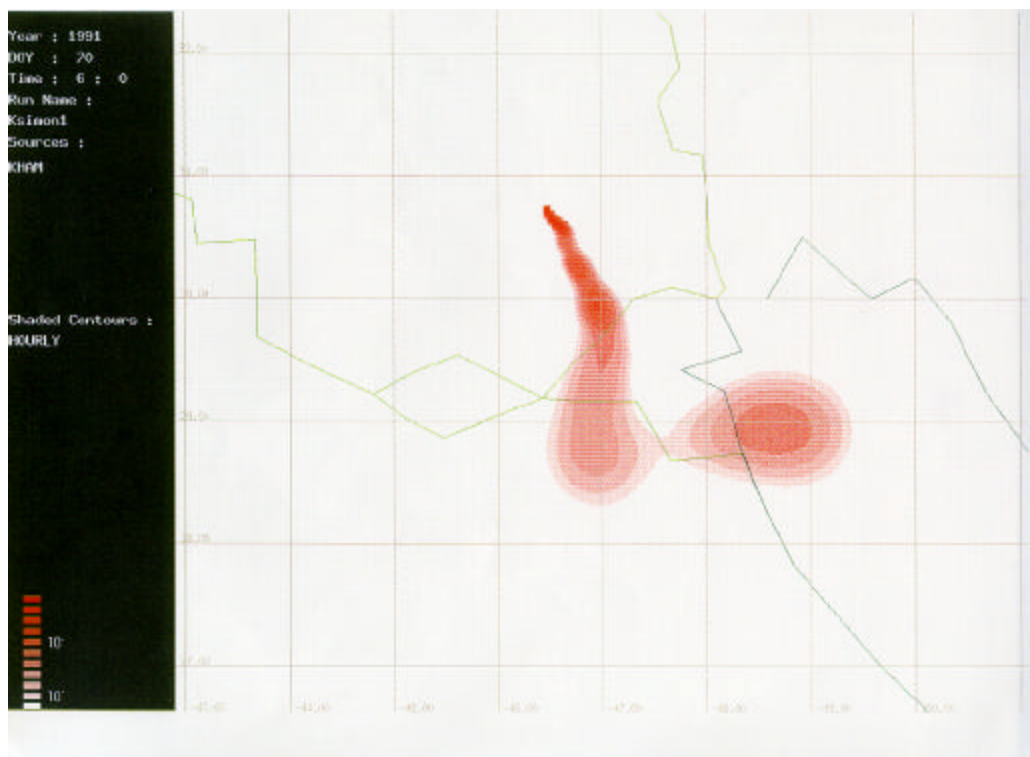
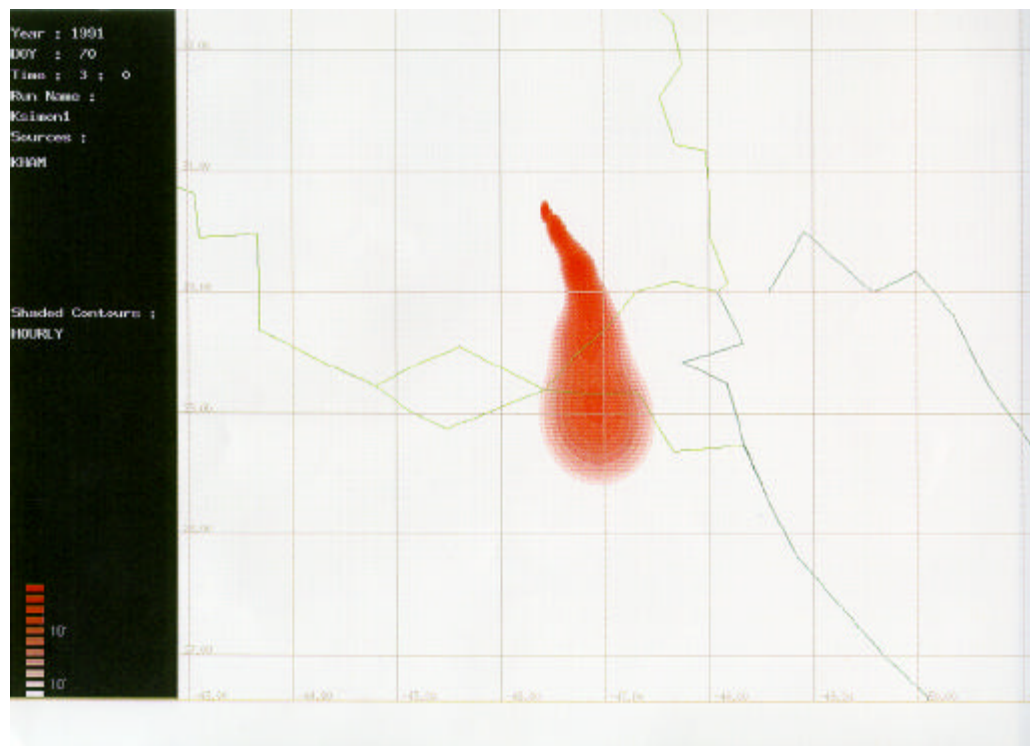
The AFTAC products, which were peer-reviewed, have substantial merit, deepening the SIU's concern that DOD/CIA did not carefully review their model of the Khamisiyah event before releasing their report on July 22. Given the defects that SIU investigators detected in the July 1997 model on which OSAGWI's notification letters were based, the SIU believes it would have been wiser and in the best interest of veterans for OSAGWI to have publicly discussed the progress of the plume analysis in July and its limitations made clear. Issuance of potential exposure notices should have been delayed until a peer-review process had adequately reviewed the conclusions that could reasonably be drawn from that model. Despite these flaws, the DOD/CIA plume modeling effort was a long overdue attempt to investigate what happened at Khamisiyah. It is likely that individuals within DOD and the CIA were aware of certain aspects of the event after 1991 and prior to 1996 even while public pronouncements indicated otherwise. Although it was not until June of 1996 that the government admitted publicly that the Khamisiyah site included chemical weapons, from available evidence there does not appear to have been a concerted attempt by the government to suppress the facts surrounding the Khamisiyah destruction. However, the failure for years to investigate fully once the allegations of presence of chemical weapons agent in proximity to U.S. troops were made was at least negligent and should not happen again.

Figure 3. The Air Force Technical Applications Center (AFTAC) Report on Atmospheric Modeling of the 10 Mar 91 Chemical Warfare (CW) Agent Release at the Khamisiyah (Iraq) Munitions Pit









ARE THERE OTHER KHAMISIYAHS?

From analysis of information produced during UNSCOM inspections, the SIU finds, based on available data, that in addition to Khamisiyah, An Nasiriyah appear to be the only location in the Kuwaiti Theater of Operations where chemical weapons were fielded during the Gulf War. There is no indication of the presence of Iraqi biological weapons in this area. Moreover, Khamisiyah appears to be the only facility in the theater of operations where coalition personnel destroyed chemical weapons. There are several sites in the region that have been the subject of inspections and debate about their potentials as chemical or biological weapons storage:

1. The Ash Shuaybah Ammunition Storage facility near Basrah had been listed as one of seventeen suspect chemical weapons storage sites by the intelligence community before the Gulf War because it housed a twelve-frame bunker and an S-shaped bunker of the type in which U.S. intelligence long believed Iraq stored chemical weapons. This facility is a probable candidate for an event involving release of chemical agent because coalition bombing during the Gulf War destroyed the twelve-frame bunker and severely damaged the S-shaped bunker. Ash Shuaybah was not inspected after the war by coalition forces because it was located in Iraqi-held territory.⁴⁰ However, UNSCOM did inspect Ash Shuaybah in August 1997 and found no sign that chemical weapons were stored in the S-shaped bunker, the twelve-frame bunker or any other storage unit. Based on the evidence available to date, this does not appear to be a site involving release of chemical agent.
2. Maymunah Munitions Depot, just north of the 32nd parallel and near Basrah, was declared by the Iraqis in June 1997 to have contained 4,100 122mm sarin/cyclosarin-filled rockets during the war. According to UNSCOM, the 122mm rockets stored at the facility were part of the same production run as the Khamisiyah rockets, and were housed in two bunkers during the war and removed afterward by the Iraqis. The bunkers were not S-shaped or configured for chemical weapons; Maymunah was not on the targeting list of possible chemical weapons sites or bombed during the Gulf War. The SIU finds that Maymunah was not a site that could have caused chemical or biological weapon exposure.
3. The CIA announced in July, 1997 that there “may have been a release of chemical agent from Ukhaydir Ammunition Storage Depot, located near Karbala in central Iraq, as the result of aerial bombing on February 14, 1991.”⁴¹ CIA and DOD have concluded that at least 104 mustard rounds were damaged during the bombing of Ukhaydir and then moved sometime later to Fallujah Proving Ground where they were found by UNSCOM inspectors in September 1991. The Special Assistant to the Director of Central Intelligence for Persian Gulf War Illnesses Issues briefed the Presidential Advisory Committee on Gulf War Veterans' Illnesses on September 4, 1997, that CIA's initial modeling of the Ukhaydir release did not indicate that any U.S. personnel were exposed. The closest coalition troop concentrations at the time were near Rafha, Saudi Arabia, nearly 300 kilometers south of Ukhaydir.

However, as of May 1998, the CIA and DOD were applying the Khamisiyah modeling approach to the possible chemical release at Ukhaydir, as well as Muhammadiyat and Al Muthanna, two other known Iraqi chemical weapons sites bombed during the Gulf War. The SIU reserves judgement pending the results of the modeling efforts.

In addition, in June of 1998 UN inspectors recovered warhead fragments from a weapons destruction site at Nibai, Iraq (approximately 30 miles north of Baghdad) which were found to have significant amounts of the nerve agent VX, disproving Iraqi claims for years that it was unable to weaponize VX. To date, there is no evidence that weapons containing VX were at sites destroyed by coalition forces during the Gulf War, although the UN's continued work on these matters may produce additional information in the future.

CZECH/FRENCH CHEMICAL WEAPONS DETECTIONS REPORTS

The Khamisiyah demolition is significant because it represents the first concrete evidence that Iraq had chemical weapons in the Kuwaiti Theater of Operations. However, the announcement in July of 1993 by the Czech Republic that members of its highly regarded Special Anti-Chemical Warfare Unit (SPCHU) detected chemical weapon agents on two occasions in northern Saudi Arabia during the first days of Desert Storm was just as significant an event for many veterans who believe that CW exposure could be an explanation for the illnesses they have developed.

On January 19, 1991, SPCHU soldiers on a training mission with Saudi forces made three nearly simultaneous detections of a concentration of nerve agent between 0.05 and 0.003 milligrams per cubic meter in the air. (In comparison, CDC and DOD standards state that the threshold level for noticeable health effects from nerve agent is 1 milligram per cubic meter.) The three detections occurred approximately 40 kilometers apart near Hafar al Batin in northern Saudi Arabia. (Hafar al Batin is approximately 40 kilometers from the Iraqi border.) A chemical alarm went off; the Czechs put on protective gear in response. Czech chemical specialists took air samples from two of the three locations and verified the contents as a G-series nerve agent in their mobile laboratory. They were unable to determine if the G-series agent was sarin or soman, but concluded it was probably sarin. An all-clear signal was given approximately forty minutes after the initial warning. No physical signs of the effects of nerve agent exposure (such as contraction of pupils or watery eyes) were observed among the personnel at the scene and none of the participants reported any acute adverse health affects at the time.

CZECH DETECTIONS NOT VERIFIED BY ALLIES

Information about these detections was reported through Czech brigade headquarters to the joint command in King Khalid Military City. A situation report was then forwarded through the Saudi military to CENTCOM in Riyadh. A U.S. team using Fox chemical agent detection vehicles (which, as will be discussed later, were ill-equipped to confirm the presence of chemical agents in vapor

detection mode) was sent to the detection area about four hours after the incident occurred. They were unable to confirm the detections. Although there were Syrian, Egyptian, French and English units in the area who possessed equipment equally sensitive to that of the Czechs, none of these forces reported any confirmed detections during this period.⁴² The Czech government also announced in July of 1993 that its chemical unit was led on January 24, 1991, by Saudi officials to a puddle of liquid 60cm by 200cm in the sand in an area about 10 kilometers north of King Khalid Military City in northern Saudi Arabia. Using a portable laboratory, the Czech unit determined the liquid to be mustard agent. No samples were taken for additional testing and the site was left as it was, unmarked. The Czech chemical unit filed a situation report. However, CENTCOM logs for January 24-26 that may have noted the incident are missing. In November of 1993, members of the Czech chemical detection unit informed a Congressional delegation, led by Senator Richard Shelby (R-AL), of another detection of mustard agent in King Khalid Military City on January 21 or January 22, 1991. This incident is mentioned in a CENTCOM chemical log for January 23.⁴³

CZECH EQUIPMENT VERY SENSITIVE

The SPCHU equipment was of Czech and Russian origin and able to detect nerve agent at much lower levels than equipment used by U.S. troops. The 1993 Shelby "Report on Trip to Investigate Persian Gulf Syndrome" stated the Czech equipment included: "a GSP-11 chemical agent detector/alarm which provides continuous monitoring capability; the portable CHP-71, a chemical analyzer used as a backup for the GSP-11; a portable laboratory which uses a litmus paper detection method, as well as other wet chemical analysis; and a mobile laboratory."⁴⁴ However, DOD critiqued Czech equipment in a declassified article from the August 2, 1994, edition of the *Military Intelligence Digest*, stating that the Czech "automatic chemical agent detectors were determined to be extremely sensitive to nerve agents, but not sensitive to interferents normally encountered on the battlefield."⁴⁵

CZECHS POINT TO BOMBING RESIDUE AS CHEMICAL SOURCE

The Czechs suggested that coalition bombing might have been a cause of the nerve agent detections on January 19, 1991. In 1993, DOD published an English language translation of a Czech Ministry of Defense report of the Czech chemical detections. The Czech defense battalion commander's activity report for January 1-February 28, 1991, states:

"During the period in question, toxic dust concentrations of Yperite and Sarin chemical agents were detected several times around the brigades, as well as in King Khalid Military City (i.e. within the military encampment in which the unit is billeted), probably as a result of allied strikes against chemical munitions depots in Iraq."⁴⁶

Coalition forces had bombed An Nasiriyah, located about 150 kilometers from Hafar al Batin, on January 17, 1991. Based on information provided by UNSCOM inspections, it now appears that

Khamisiyah and An Nasiriyah were the only locations in southern Iraq where CW munitions were deployed during the Gulf War but that coalition bombing did not result in the destruction of any chemical weapons at An Nasiriyah. A U.S. intelligence assessment of chemical and biological warfare in the Gulf provided in 1994 to a Defense Science Board panel investigating Gulf War illnesses listed the following possible sources of the nerve agent detected by the Czechs on January 19: deliberate overt or covert use by the Iraqis; accidental releases through leaking weapons; unintentional releases as a result of coalition actions; and a deliberate release unrelated to military operations.⁴⁷

DID THE FRENCH DETECT MUSTARD AGENT?

CENTCOM log entries indicated that French forces stationed in King Khahlid Military City detected mustard agent in that area on either January 20 or 21, 1991. French personnel contacted the Czech unit in the area, who confirmed the detection. There are no records of a Czech reporting of this incident.⁴⁸ According to information given to the Shelby delegation, French military personnel also detected nerve and mustard agent at a logistics facility 27 kilometers south of King Khahlid Military City on either January 24 or 25, 1991. French chemical detection alarms were activated at two locations approximately 100 meters apart. Litmus badges on the protective suits worn by French troops registered the presence of mustard agent. According to the French, Czech chemical units were called to the scene and confirmed the presence of a mustard or nerve agent. This information was provided by a French military officer to the French chain of command and appears in CENTCOM logs, but has never been officially confirmed by the French government. The Czech chemical unit did not report these events. However, the detections were reported to CENTCOM headquarters and appear, along with the Czech detections, in CENTCOM chemical logs.⁴⁹

SENATE INVESTIGATORS MEET WITH ALLIES

Members of the SIU's investigative staff accompanied OSAGWI personnel on a fact-finding trip to the Czech Republic, France and Great Britain in September of 1997. The delegation met in Liberec, Czech Republic, with the commanding officers of the First Chemical Protection Brigade. During the discussions, a member of the Czech chemical unit that was deployed to the Gulf reconfirmed that on at least two occasions during the Gulf War, Czech units detected chemical agents: the G-series nerve agent (sarin or soman) detection on January 19, 1991, and the mustard agent detection on January 24, 1991. However, the officer was unaware of the source of the detections. In France, government officials did not acknowledge or confirm any of the CW detections made by their military personnel during the Gulf War.

It is unlikely, now nearly eight years after the Gulf War, that the actual source for the Czech or French detections will ever be found. Many veterans continue to believe that chemical exposure resulted from fallout of coalition bombing of Iraqi chemical weapons sites in the first days of the Gulf War. DOD continues to discount these claims. Nevertheless, OSAGWI has embarked on an effort similar to the Khamisiyah venture to model the release of mustard and nerve agents from Ukaydir,

Muhammadiyah and Al Muthanna in central Iraq. This effort may help inform veterans as to whether they may have been exposed to some level of chemical agent during their service in the Gulf. The SIU finds that the Czech chemical agent detections, particularly those of January 19 and January 24, are credible, but only at very low levels and the presence of these agents does not appear not to have resulted in adverse health effects to the Czech soldiers involved.

WEAKNESSES IN CHEMICAL AND BIOLOGICAL READINESS

In testimony before the Committee on January 29, 1997, General Norman Schwarzkopf, the CENTCOM Commander during the Gulf War, defended his strategy against possible Iraqi use of chemical and biological weapons by stating:

“In planning our military campaign against Iraq six years ago, we focused on our enemy’s strengths and weaknesses. The one area in which they far exceeded our capabilities was in chemical and biological warfare. We knew they had a very large stockpile of chemical weapons and had embarked upon a program to develop biological weapons. Further, they had demonstrated their willingness to use such weapons both in the war against Iran and in campaigns against the Kurdish population in northern Iraq.

“The measures we took to eliminate the enemy’s chemical and biological threat were both active and passive. The active measures were the destruction of known storage and production sites in the earliest stages of the strategic air campaign and also the systematic destruction of the enemy’s chemical delivery systems, which consisted of their air force and principally their artillery.

“The passive measures that we took were all designed to protect our troops with the absolute finest technology available at the time. It should be remembered that this technology was designed to fight in a chemical environment created by the Warsaw Pact. As protection against biological agents, our soldiers were immunized against many diseases and some were further immunized against the two biological agents we suspected the Iraqis might use.”⁵⁰

Despite General Schwarzkopf’s statements, the SIU found a lack of command emphasis on chemical and biological defense prior to the Gulf War that resulted in readiness shortfalls during the war. These shortfalls contributed to veterans’ sense of uncertainty and suspicion that chemical or biological agents may be causing their symptoms. Equipment and training shortfalls resulted in false alarms from the M8A1 Alarm System and the Fox vehicle. Vaccine shortages resulted in incomplete administration of vaccines to only a portion of the troops. Shortages in protective clothing shortages

were managed by extending suit wear time and altering established procedures, but these modifications, born of necessity, also contributed to veterans' uncertainty about their protection.

DOD has recognized these shortfalls and increased both the funding and visibility of chemical and biological defense. Budgets for procuring and developing more sensitive detectors and more lightweight clothing, for example, have increased substantially. However, chemical and biological defense is not routinely addressed or summarized in readiness reports to higher commands, which does little to increase its training priority for the field commanders who are ultimately responsible for a ready force.

Preparedness for defense against a CW attack was not a high priority for DOD in the years preceding the Gulf War. Historically, DOD has allocated less than one percent of its budget to chemical and biological weapons defense.⁵¹ A lack of command emphasis on chemical and biological weapons defense resulted in part from military and policy makers' focus on deterrence of nuclear threats during the Cold War. Unit commanders have the authority to reallocate funds in their Operations and Maintenance (O&M) accounts, which support a diverse range of DOD readiness and quality of life priorities. As a result, commanders could, and did, re-route funds designated for purchase and maintenance of chemical and biological defense equipment to other command priorities or operations needed to fight a conventional war.⁵² A further disincentive to train in chemical/biological protective clothing is its discomfort and the diminished operational performance that results from that discomfort.⁵³

GAO CRITICAL OF CHEMICAL/BIOLOGICAL TRAINING PROGRAMS

In a March 1996 report, GAO examined U.S. forces' preparedness for chemical and biological defense by assessing rotations of units through Combat Training Centers from fiscal years 1989 to early 1990 (before Gulf War preparations were underway). GAO found that over 70 percent of the units were considered untrained by their commanders in ten of the fourteen tasks related to chemical and biological defense. These tasks included commanders' use of chemical and biological intelligence information (60 percent untrained), donning protective gear (73 percent untrained), unmasking procedures (100 percent untrained) and administering first aid (83 percent untrained). GAO also found that joint forces, such as the one created for the Gulf War, were seldom trained on common protocols for chemical or biological attacks.⁵⁴

THE U.S. MILITARY WAS NOT WELL-PREPARED FOR CW ATTACKS IN THE GULF WAR

Commanders' emphasis on their units' CW preparedness changed when faced with an actual threat of chemical attack from Iraq, which had already used such munitions on its enemies and even its own people. Troops deployed to the Gulf underwent many hours of training in donning their protective gear. In addition, a strategy of deterrence was employed by informing Iraq that a first use of chemical weapons causing mass casualties against coalition troops would result in an attack "by all means that

we [the coalition] have available at our disposal,” according to testimony by General Schwarzkopf before the Committee.⁵⁵ However, years of inattention could not be overcome in the few months leading up to the conflict. As the following statement shows, DOD officials acknowledge that the lack of preparedness at all levels was due to the absence of information available on the readiness of the troops for chemical attack:

“As Desert Shield deployments began, OSD [the Office of the Secretary of Defense], the services and the Joint Staff quickly realized that they had virtually no information on training status and chemical defense equipment levels of the deploying forces . . . We simply had no system in place to tell if our units had too little equipment or had surpluses. To help manage the problem, the Joint Chiefs of Staff directed the establishment of a special General Officers Council to coordinate the equitable distribution of equipment and to start building a database from scratch . . . The lack of NBC readiness reporting created a tremendous amount of work and significantly delayed decisions to accelerate production of critical equipment.”⁵⁶

THE INDUSTRIAL BASE WAS SLOW TO RESPOND TO PRODUCTION NEEDS IN SUPPORT OF CW PREPAREDNESS

Industrial production of chemical protective suits had to increase from pre-Gulf War production of 33 thousand suits per month to 200 thousand suits per month. Such a surge, according to DOD, required nine months for the chemical suit industrial base to reach required maximum production.⁵⁷ Anticipating shortages in the existing stocks, the Defense Personnel Support Center awarded suit contracts in August and September 1990. However, by the end of March 1991, about one month after hostilities had ceased, only 25 percent of the scheduled suits had been delivered.⁵⁸ These shortages led to making adjustments in the field such as extending the wear time of MOPP gear beyond optimal shelf life and delaying use of full MOPP protection until an attack actually ensued.⁵⁹ For example, Army personnel present at the Khamisiyah demolition reported to SIU staff that they only had one set of MOPP gear in their possession, instead of the required two sets.⁶⁰ Had they been exposed to a detectable level of chemical warfare agent during the demolition, they would have had to withdraw from the area because their only set of MOPP gear would have been contaminated. A subsequent GAO report released in March 1996 showed that units continued to lack critical chemical and biological equipment, including protective clothing, detection paper, and decontamination supplies.⁶¹

Logistical support and planning for administering vaccines against biological weapons was worse than for the chemical detection equipment. DOD did not have a plan in place to determine which vaccines needed to be administered, when they were to be given, and to whom.⁶² Although the vaccine for anthrax was an FDA-approved drug, DOD was only able to vaccinate about 150,000 of the almost 700,000 service personnel in theater. The vaccine for botulism, which has not been fully

approved by the FDA, was administered to only about 8,000 service personnel.⁶³ (The use of vaccines for CBW defense in the Gulf War is discussed in more detail in Chapter Three.)

TRAINING AND TECHNOLOGY LIMITATIONS

Limitations in technology and training for chemical and biological equipment led to inconclusive evidence and misleading conclusions regarding the deployment of chemical and biological agents. Appendix G provides a list of chemical protective equipment deployed to the Gulf War. Some key limitations of equipment used during the Gulf War are described below.

M8A1 Alarm Systems Sounded Frequent False Alarms

The frequency with which M8A1 Alarm Systems sounded falsely during the Gulf War led to a sense of complacency towards the alarms (in some cases, resulting in troops simply turning them off) and confusion as to whether chemical agent had been used or was present in the vicinity. This alarm system is a remote, continuous air sampling device designed to detect nerve agent vapors and warn personnel of its presence with both audible and visible signals. The alarm sounds during required maintenance procedures and is also designed to be very sensitive so that nerve agent releases above a certain threshold do not go unnoticed. However, this high degree of sensitivity also reduced the system's selectivity, so that it often would alarm when it detected substances that were not nerve agent. Unfortunately, these included many substances and conditions that were very prevalent during the Gulf War, including high temperatures, high concentrations of sand, diesel and gasoline exhaust, insecticides, paint fumes, and cigarette smoke.⁶⁴ Although it is impossible to determine the total number of false alarms, over 12,000 of the systems were deployed to the Kuwaiti theater of operations. Taking into account these numbers, there could have been tens of thousands of false alarms or alarms sounding solely for maintenance purposes during the Gulf War.

Fox Vehicle Readings May Have Resulted in More Questions than Answers

Ineffective use of the German-made Fox vehicle also led to inconclusive findings of chemical agent. (See Appendix H for more detailed discussions of Fox vehicle capabilities.) DOD procured from Germany 60 Nuclear, Biological, and Chemical (NBC) Reconnaissance Systems, known as the "Fox." The first Fox vehicle arrived in the Kuwaiti theater of operations in September 1990, and the last arrived in the middle of February, a short time before the onset of the ground war.

Although the Department of Defense believed the Fox, "was the most sophisticated and technically complex piece of chemical detection equipment that the U.S. used in Operations Desert Shield and Desert Storm,"⁶⁵ its actual performance did not measure up to expectations. Built to run in the European countryside, on its roads, and over similar terrain, the Fox was not the best choice for the desert conditions encountered during the Gulf War. Further complicating its use was the fact

that the training provided to the American operators was not thorough enough to enable them to develop the expertise necessary to utilize the Fox capabilities to the fullest.

Time and again, case narratives prepared by OSAGWI (discussed more fully later in this Chapter) describe situations in which the Fox vehicles provided false positive readings that led veterans to believe that they had been exposed to chemical agent. (These instances are addressed in Appendix H.) The lack of adequate training prior to the Gulf War and the resulting inconclusive readings from the Fox vehicles put DOD in the position of refuting veterans' assertions that CW was used, despite positive readings produced by the Fox. Either scenario reduces DOD's credibility and contributes to suspicions that DOD has a bias against agreeing with veterans and "admitting" that CW was deployed during the Gulf War.

Biological Agent Detection Capabilities Are "Rudimentary"

The Department of Defense has described its biological agent detection capability during the Gulf War as "rudimentary."⁶⁶ DOD had no standoff capability for detecting biological agent, which means that troops would have had no advance warning of a biological weapons attack. Further, point detection capability—the ability to identify an agent at the point where contamination is occurring—could only provide confirmation of an attack thirteen to twenty-four hours after the attack had occurred. While this capability would have provided some help in treating biological casualties, the Army has reported that had a biological attack occurred it would have created enormous casualties that would have severely overtaxed the U.S. medical system.⁶⁷ This investigation found no direct evidence that the Iraqis offensively used chemical or biological weapons during the Gulf War. Nonetheless, it is imperative that shortfalls in U.S. military readiness to address such threats are identified so that our troops are truly prepared for a chemical or biological attack. DOD's efforts to address some of these shortfalls, including its current plan to vaccinate all forces against anthrax, are addressed below.

Chemical and Biological Weapons Visibility and Funding

Public awareness of weapons of mass destruction has been raised by their use in the Iran-Iraq War, the threat of their offensive use during the Gulf War, and the 1995 Tokyo subway attack using sarin. Other instances that have heightened awareness are false alarms such as the anonymous package labeled "anthrax" that was delivered to the B'nai B'rith in Washington, D.C. on April 24, 1997 and the March 1998 controversy over two individuals in Las Vegas who obtained what was thought to be anthrax bacteria. These incidents, combined with instability of post-Cold War regimes and shifting regional power balances, underscore what the Congressionally-established Counter Proliferation Program Review Committee stated in its May 1997 report: "The potential for catastrophic use of NBC weapons is greater than it has been in many decades."⁶⁸ Budgetary constraints have also increased the threat of weapons of mass destruction. According to a former director of the CIA Nonproliferation Center: "Most nations today see the increasing sophistication,

hence the cost, of conventional weapons as unreachable . . . A growing number of countries look to cheaper weapons-of-mass-destruction programs as a deterrent or even an offensive capability against a larger, more conventionally capable opponent.”⁶⁹

STEPS TAKEN BY DOD TO INCREASE CHEMICAL AND BIOLOGICAL WEAPONS DEFENSE READINESS

In light of the increased threat, DOD has increased funding, set up task forces to identify and recommend solutions to logistical shortfalls, established DOD-wide chemical and biological defense material requirements, and made upgrades to detection and protection equipment. The following summarizes those efforts:

JOINT DOCTRINE DEVELOPMENT AND FUNDING LEVELS FOR CBW DEFENSE

A Joint Doctrine for NBC Defense, which was not present during the Gulf War, was published in 1995.⁷⁰ However, DOD still lacks adequate doctrine and policy for defense of ports and airfields against chemical and biological weapons attacks.⁷¹ The May 1997 Report of the Quadrennial Defense Review recognized a funding shortfall in chemical and biological defense and recommended a budget increase in that area, particularly for protective measures against chemical weapons.⁷² In its 1999 budget submission, DOD increased its procurement and research budgets for chemical and biological defense by almost \$151 million.⁷³ In its 1999 to 2003 planning documents, DOD projects a total \$731 million increase in CB defense.⁷⁴ However, it is unclear if these increases will be sufficient to achieve adequate levels of readiness in this area.⁷⁵

DOD TO DEVELOP SERVICE-WIDE PROTOCOLS

DOD is working to establish chemical identification requirements that will be generated jointly and validated across all services. The study, known as JCHEMRATES IV, will reflect a combat scenario of a recently developed war game in which offensive use of chemical weapons is assumed. Although originally expected to be part of the February 1998 Annual Report to Congress, the study was still in draft when the annual report was written.⁷⁶ A Joint Service Materiel Group has developed a joint service nuclear, biological and chemical defense logistics support plan outlining short-, mid-, and long term strategies to resolve sustainment issues.⁷⁷

ARMY CHEMICAL FORCE TO BE STRENGTHENED

The Army is increasing the relative size of its chemical force structure by taking smaller personnel reductions in chemical specialties relative to the entire force. Forces in chemical specialties have been reduced by 13 percent, while the rest of the active and reserve Army forces have been reduced by 28 percent.⁷⁸ An Army-commissioned study on chemical and biological defense lessons learned

identified steps to mitigate weaknesses in the program. Although a plan to implement the myriad of recommendations is being implemented according to a chemical school official, the SIU staff was unable to verify their progress.⁷⁹

NEW CHEMICAL AND BIOLOGICAL AGENT ALARMS ARE BEING DEVELOPED

An Automatic Chemical Agent Detection Alarm (ACADA) has been developed to replace the M8A1 alarm. It is designed to reduce the number of false positive readings and be able to detect mustard agent. DOD plans to begin fielding the ACADA in fiscal year 1998 and expects to have it fully fielded by fiscal year 2002.⁸⁰ To detect biological agents, three vehicle-mounted long-range detection systems have been fielded with the ability to track aerosol clouds indicative of a BW attack. Point detection capability for biological agents has also been increased with the fielding of 38 mobile Army Biological Integrated Detection Systems and 25 Navy Interim Biological Agent Detector shipboard systems. These point detectors decrease confirmation time from up to 24 hours in the Gulf War to about 30 minutes. Virtually all of these units are with reserve forces in the United States and those forces are not fully manned. In addition, DOD has short, mid- and long-range plans to improve the capabilities of these systems.⁸¹

DOD'S ANTHRAX VACCINATION PLAN

The most recent, and perhaps the most dramatic, attempt by DOD to increase preparedness against biological agent attack is its plan, announced in December 1997, to vaccinate the total force, currently estimated at 2.4 million members, against the biological agent anthrax. The vaccine is approved by the FDA.⁸² The SIU foresees significant logistical and record keeping challenges in implementing this program. This program should be monitored closely to ensure that future veterans have the benefit of appropriate health records and medical research relating to this vaccine.

In testimony before the Committee, GAO identified five lessons learned that DOD should consider to successfully manage the program. First, DOD must ensure the accuracy of personnel data systems to ensure that all service members receive the required vaccinations. Second, because DOD plans to administer the vaccinations in a decentralized manner at multiple locations, high level commanders need to emphasize the program's importance. Third, medical records documenting vaccinations must be complete. Fourth, DOD's centralized database for monitoring program implementation, currently under development, must be accurate. Finally, efficient inventory controls are necessary, particularly given the one-year shelf life of the anthrax vaccine. In its review of the Bosnia deployment, GAO found weaknesses in DOD's systems for identifying service members' locations, maintaining medical records and databases, and tracking inventory for a vaccine against tick-borne encephalitis, prompting these recommendations.⁸³ In addition, only one location in the United States currently produces anthrax vaccine, and it is unclear if that sole-source approach is capable of producing adequate usable amounts of the vaccine sufficient to meet DOD's needs.

LOGISTICAL AND TECHNICAL CHALLENGES

In its March 1998 annual report to Congress on NBC defense, DOD reported improvements in the industrial base supporting chemical defense equipment, which in the 1997 report was described as “extremely fragile.” Despite improvements in the overall supply of NBC defense equipment, some critical items (such as chemical agent detectors and collective protection) remain at high risk, meaning the services have less than 70 percent of the required equipment on hand. In addition, the report noted, the services continue to have very little oversight over procurement and use of consumable items (supplies which are consumed in use, such as M8/M9 detection paper and chemical suits), and as such currently cannot readily determine the extent of such equipment shortfalls. The report concluded:

“Because of a lack of visibility of NBC defense items, unclear wartime requirements (given the post-Cold War environment), scarce Operations and Maintenance funds, and low priorities given to NBC defense stocks, the current quantity of DLA [Defense Logistics Agency] and AMC [Army Materiel Command] NBC defense war reserves have been reduced and will not support sustainment requirements during a full two MTW [Major Theater War, the planning factor under the National Military Strategy] scenario.”⁸⁴

The services have increased the visibility of chemical and biological defense by making it a mandatory element for which commanders must provide comment in monthly combat readiness reports.⁸⁵ However, the comments are in a narrative section that is not routinely subject to statistical analysis or summary for higher headquarters. DOD has stated that this system was not intended to be a detailed management tool on all conceivable variables.⁸⁶ Although DOD prepares Joint Monthly Readiness Reports that juxtapose various war fighting scenarios against the readiness of units and their deployment schedule, they do not regularly assess chemical and biological weapons defense as a part of those scenarios. In addition, DOD summarizes readiness in quarterly reports to Congress, but these reports are not sufficiently detailed to provide an assessment of this aspect of readiness.⁸⁷

DOD MUST SET PRIORITIES FOR IMPROVING CBW PREPAREDNESS

DOD has recognized some of its weaknesses related to CBW defense readiness, established some strategies to resolve them, and increased funding which could offset many of the supply shortfalls. However, to the extent CBW readiness and training is funded by Operations and Maintenance Accounts, commanders will have the prerogative to divert funds intended for CBW defense toward other operational priorities to fight a conventional war. The SIU is not in a position to recommend that commanders' prerogative be limited in this regard, and indeed, recognizes both the advantage and necessity of such a prerogative. The SIU also recognizes that commanders face increasing challenges in maintaining their troops' readiness to fight in many areas because of increased

deployments to peace-keeping operations. Therefore, if DOD believes that CBW readiness is a high priority, and chooses to fund much of it through O&M accounts, it is imperative that a high priority be given to CBW readiness, so that unit commanders allocate limited resources to training and spare parts. One way to do this is to increase the visibility of chemical and biological defense readiness factors in the various reporting venues. This will also involve careful and vigorous oversight by DOD leadership of proposed strategies to ensure their implementation and effectiveness.

INFORMATION COLLECTION AND RECORDKEEPING SHORTFALLS DURING THE GULF WAR

DOD's mishandling of medical records, classified operational logs, and other evidence related to suspected chemical agent detections have hampered efforts to reconstruct events in the Gulf War that could shed light on potential causes of Gulf War illnesses. In addition, DOD's inability to track the location of units deployed throughout the theater has slowed and made less accurate the efforts to identify who might have been exposed to which potential hazard.

RECORDS MISMANAGEMENT COMPLICATES ANALYSIS OF GULF WAR EVENTS

The first casualty of the Gulf War may have been basic, required record keeping. Consequently, inadequate information has stymied the efforts of Gulf War illness investigators. For instance, missing records have hindered efforts to assess certain factors that may be associated with Gulf War veterans' illnesses. Critical evidence from several suspected detections of chemical warfare agents either disappeared or was routinely destroyed shortly after the war. Although DOD investigators believe that most chemical agent detections were false, the public credibility of such claims suffers in the face of missing evidence. Federal records laws and DOD regulations and policies provide clear requirements for retention of a variety of documentation—including in written, photographic, and electronic formats—that records for the future operations and activities related to wartime. The incomplete data and mishandled evidence from the Gulf War are irretrievable, but as another lesson learned, DOD must improve records management during future conflicts.

TROOP MOVEMENT AND MEDICAL RECORDS

During the Gulf War, DOD lacked a system to track the location of units deployed throughout the theater. Moreover, those records of unit locations that may have been made were incomplete or inaccurate. There was no system to pinpoint the location of individual servicemen, which now hinders epidemiological studies.⁸⁸ In 1992, the Army Center for Health Promotion and Preventive Medicine developed a troop Exposure Assessment Model that can be used to determine where troops were and to what they were exposed. The development is nearly finished and will, it is hoped, provide a reliable mechanism that can be used for future recording purposes. Absent this system, the DOD

in its Khamisiyah investigation was forced to assemble and debrief operations officers from the Army's 7th Corps to attempt to reconstruct unit locations over six years after the end of the Gulf War.

HEALTH SURVEILLANCE SHORTFALLS

Many of the soldiers deployed in the Gulf War theater did not have updated pre-deployment health status information or complete post-deployment physicals. The absence of this irreplaceable medical surveillance information not only makes it impossible to have a base line for any follow-up action, but also complicates epidemiological research.⁸⁹

In May 1997, GAO found that some improvements had been made in medical surveillance since the Gulf War but that shortcomings remained during the Bosnia deployment. (This issue is more thoroughly addressed in Chapter Three.) DOD also is developing a more automated medical record keeping system, which includes a dog tag-sized card, called a Personal Information Carrier (PIC). The PIC will store an individual's medical history, medical documents, X-rays and vaccination records. It has been prototype tested, and is scheduled for more extensive testing in 1998 and fielding in 1999.⁹⁰

VACCINATION RECORDS

Records of vaccinations received in theater and records of the use of pyridostigmine bromide (PB) are incomplete and generally unavailable. For example, FDA did not waive the requirement that DOD had to keep records on adverse effects from troop usage of pyridostigmine bromide (PB) as part of its waiver allowing DOD to administer this investigational drug during the Gulf War. (The PB and the FDA waiver process is discussed in Chapter Three.) Yet, as a Defense Science Board Task Force observed, "[a]lthough all units were given PB, the Department of Defense does not have records of which military personnel actually ingested PB, nor of how many tablets may have been ingested."⁹¹ Moreover, the SIU obtained via correspondence with the Deputy Secretary of Defense information about medical products (including vaccines, antitoxins, immune globulins and pharmaceuticals) that were fielded or administered during the Gulf War. DOD provided six pages of charts detailing the products fielded, the current manufacturer, license status and the number of doses fielded. However, DOD could not provide an accurate assessment of the doses administered to U.S. personnel in the Gulf. Instead, only an approximation of doses administered was provided for the anthrax vaccine, the botulinum toxin vaccine and PB. No information was available for other medical products.⁹² Lack of such basic medical information will preclude a definite epidemiological analysis of the impact of vaccines and drugs on Gulf War veterans' health and raises questions about DOD's ability to fully document future administration of drugs or vaccines to troops on a large scale.

RECORDS OF PESTICIDE USE WERE NOT KEPT

Although DOD carefully recorded the type and amount of pesticides shipped to the Persian Gulf, no records exist on how the pesticides were used. Again, the lack of data impedes researchers' efforts to compare environmental exposures to observed illnesses.⁹³

CENTCOM'S RECORDS MANAGEMENT SYSTEM IS INEFFECTIVE

Desk officers in Riyadh created approximately 180-210 pages of chemical weapons logs during the Gulf War. Veterans' groups, congressional committees, the press, and members of the public have sought these documents as critical evidence in the investigation of suspected chemical detections during the Gulf War. Despite a thorough investigation by the DOD Inspector General, the DOD has unearthed only 37 log pages. According to a report issued by the Office of the Inspector General, the remaining pages might have been improperly destroyed after reaching CENTCOM headquarters in October 1994. The investigators "could not establish a definitive explanation of what happened" to these pages. However, the report states that "the most probable explanation" is that they were destroyed "as part of an internal office relocation, personnel changes, and movement of the NBC records."⁹⁴

RECORDS MANAGEMENT ENFORCEMENT LACKING

The SIU requested the DOD IG Audit Division to pursue the problems it has identified with enforcement of proper and legally required records management procedures at CENTCOM. These appear to have been a major cause of the current lack of records related to the Gulf War deployment. As a result, the DOD IG Audit Division has recommended that records management be assessed by the CENTCOM commander under the DOD Management Control Program.

DEPLETED URANIUM

The Defense Department believes that depleted uranium-based (DU) weapons offered Gulf War troops the maximum available effective and efficient firepower for force projection. It is also used as protective armor on tanks to protect troops inside against enemy attacks. However, with the exception of the work being done at the VA Medical Center in Baltimore, there does not appear to be significant post-war research into DU's long-term health effects on military personnel. The OSAGWI January 1998 annual report confirmed the DOD's failure to properly train troops in proper DU handling procedures. The same report also noted the DOD's failure to notify troops potentially exposed to expended DU ammunition on the battlefield or during cleanup operations after the war. It is clear that more research should be done and that the Defense Department has been slow to conduct long-term studies of or effective training about DU as a post-battle hazard. (The health effects of depleted uranium are discussed in greater detail in Chapter Three of this report.)

As noted in the OSAGWI annual report, DOD experts were aware of the potential for radiation and heavy-metal exposure to DU ammunition before the war but failed to pass along this knowledge to the troops in the field. According to the report, DOD will be undertaking additional DU studies. There already exists some Army-developed evidence that dose levels produced by DU stores in the Bradley Fighting Vehicle may exceed the allowable limit established by the Nuclear Regulatory Commission (NRC) for the general public in some areas of the crew compartment, based on estimated annual occupancy times. While these levels appear to be at least an order of magnitude lower than the level established for radiation workers, the Army has stated it will work to reduce the levels to conform to NRC general public standards.⁹⁵

This information was available to the Army prior to the Gulf War, yet pre-deployment training and in-theater refreshers did not adequately impress soldiers with an understanding of depleted uranium's intrinsic properties or of safety procedures to be followed when handling DU ammunition or DU-damaged vehicles. There are a number of outstanding DU exposure cases that merit continued investigation and medical care and tracking. Especially if depleted uranium is to continue to be a factor in future conflicts, additional scientific research is necessary to obtain the fullest understanding possible of its potential health consequences to military personnel who may be exposed to it.

OSAGWI CASE NARRATIVES

In 1997, OSAGWI began publishing a series of case narratives and information papers on DOD's investigation into the potential exposure of troops to chemical and biological agents. As of May 1998, OSAGWI had released eleven case narratives examining specific cases of suspected chemical exposure and four information papers that provide background material on topics such as agent alarms and medical surveillance. This series of reports provides both the government and the public with insight on details of Gulf War events that may have had an impact on Gulf War veterans' health. However, it appears that the priority for determining what topics are addressed in the case narrative format is determined primarily by perceived outside pressure rather than an assessment as to what is believed to be most relevant and useful in addressing Gulf War veterans' illnesses. While the SIU acknowledges the need to be responsive to the public, it also believes that these case narratives should function as part of a larger strategic plan to identify potential causes of Gulf War illnesses. OSAGWI could further improve the success of the case narratives by addressing the following weaknesses: 1) OSAGWI's methodology for determining the likelihood of chemical exposure has been inconsistently applied, 2) the case narratives to date do not routinely include a lessons learned section; and 3) there appears to be a lack of coordination between products.

For example, the "U.S. Marine Corps Minefield Breaching" narrative shows an apparent lack of coordination by OSAGWI in ensuring that the information presented in the narratives is consistent. During minefield breaching operations of the 1st and 2nd Marine Divisions on the first day of the ground war, there were two separate accounts of chemical detections. Despite comments made by

a Marine general emphasizing the many months in Saudi Arabia spent training on the detection of chemical weapons, this narrative fails to recognize that operators of the spectrometer were not trained to perform the series spectrum analysis needed to confirm the presence of a chemical agent. An OSAGWI information paper on the Fox vehicle, however, cites this as a major limitation to the employment of the Fox during the Gulf War.

The Marine Breaching narrative also speaks of the Fox being “used for on-the-move vapor detection.” It goes on to say that the Fox is not optimized for vapor detection, and several pages later it categorically states that the vapor detector mode is less sensitive than the human body itself in detecting the presence of a chemical nerve agent, noting that “[w]hile using the vapor detection method, human symptoms would most likely appear before the Fox . . . would alert.” Clearly, this fact should have been cited in reference to Fox CW detections in other case narratives, but was omitted. In fact, as stated above, OSAGWI should have learned as much from the Defense Science Board June 1994 report, which stated:

“Although sensitive and specific for identification of ground contamination, the mass spectrometer system on board the FOX is not optimized for sampling and alerting to generalized airborne vapors of chemical materials. When operating in the air sampling mode, the FOX is not a suitable warning device; very high concentrations of chemical agents would have to be present, such that unprotected troops in the vicinity would be adversely and acutely affected.”⁹⁶

Another example of lack of consistency in the case narratives is the narrative addressing the “Reported Mustard Agent Exposure” of PFC David Fisher. This case narrative inexplicably designates the event as only “likely” to have occurred instead of “definitely.” The case narrative describes how PFC Fisher brushed up against an Iraqi munitions bunker and then later developed blisters on his arm consistent with mustard exposure. The term “likely” was used despite overwhelming evidence in the narrative supporting exposure to a blister agent (mustard liquid) and the separate investigation resulting in PFC Fisher being awarded a Purple Heart for his wound by the U.S. Army. Ironically, this narrative details the methodology for chemical incident investigations and all the criteria would appear to have been checked for a positive identification and confirmation; even the commander of the US Army Medical Research Institute of Chemical Defense at the time called it an exposure to although not an intentional use of CW agent by Iraq.

In contrast, the case narrative of the “Al Jaber Air Base” incident provides a fact scenario that is characterized as “unlikely” although the weight of the evidence produced supports a conclusion that chemical warfare agents were “definitely not” present. Here again, the Fox vehicle’s MM-1 served as the initial alarm. However, at that time the MM-1 was in the vapor-sniffing mode, which, as noted above, is not as sensitive as the human body in detecting chemical weapons. The apparent absence of chemical agent was underscored by the fact that the two men riding on top of the Fox in

only MOPP-2 did not suffer any symptoms while the alert was occurring. M-256-A1 chemical weapons detector kits also failed to confirm any of the alerts, which were eventually explained away by an environment thick with black smoke from the oil well fires.

OSAGWI narratives produced to date also seem to treat inconsistently cases where there is no evidence of the presence of chemical agent based on detection equipment or laboratory analysis. For example, the “Tallil Air Base, Iraq” narrative was also deemed “unlikely” as opposed to “definitely not,” and in this case absolutely no alarms, alerts or other aspects of chemical weapons usage were cited. The only evidence cited to support the conclusion was the presence of a large quantity of CW defensive gear. Similarly, presence of a chemical agent on a SCUD missile fragment retained as a souvenir by a soldier stationed near the King Fahd Military City, was also deemed “Unlikely” in the “Possible Chemical Agent on SCUD Missile Sample” case narrative despite multiple analyses of the sample showing that no agent was present. The soldier had reported to the PAC that the piece of metal from the SCUD would cause agent exposure symptoms to an unprotected person. However, since neither the chain of custody for the piece of metal, nor the reported symptoms when exposed to the metal, could be verified, OSAGWI assessed the incident as “Unlikely,” as opposed to “Definitely Not,” a chemical agent incident.

Two incidents described in the “Al Jubayl, Saudi Arabia” case narrative also lacked any positive detection of a chemical agent and were assessed as “Definitely Not” a chemical agent. In the first incident, components from an unexploded SCUD missile that hit the harbor near Al Jubayl showed negative test results for a chemical agent. The second incident, in which the brown T-shirts of Marines posted near an industrial base at Al Jubayl turned purple when exposed to unidentified noxious fumes, also showed no positive chemical agent readings. Medical symptoms reported by the Marines after their exposure to the fumes were not consistent with chemical agent exposure.

The case narrative of the Kuwaiti Girls’ School incident (issued March 11, 1998) represents OSAGWI’s best effort reviewed by the SIU staff as of May 1998. While this incident is ultimately labeled “Definitely Not” a case of chemical agent presence, it goes to great lengths to explain the initial confusion surrounding the preliminary identification of a noxious liquid found at that location as mustard agent. The case narrative presents a credible explanation of the way this occurred. It reviews all the evidence (including expert analysis of Fox vehicle MM-1 tapes), and the added fact that the girls’ school was a SILKWORM missile testing and maintenance site, leading to the conclusion that the liquid was red fuming nitric acid (a substance commonly found in vicinities where missiles have been present) and not a chemical warfare agent.

The case narratives and information papers represent the most thorough and comprehensive investigation by the DOD of possible chemical warfare agent exposure events since the Gulf War. However, the case narratives also represent lost opportunities for DoD. It would be helpful if OSAGWI could produce a comprehensive document drawing lessons from these incidents and making recommendations similar to the CIA’s Lessons Learned: Intelligence Support on Chemical

and Biological Warfare During the Gulf War and on Veterans' Illnesses. Instead, OSAGWI to date has only partially addressed this issue by including a brief lesson-learned section in its "1997 Annual Report." This segment is merely a summary derived from the case narratives and lacks the details that would make the description of lessons learned more evocative and useful. On March 20, 1998, OSAGWI announced that its investigators were working on 19 case narratives, two information papers, and two updated reports with the expectation that the results of a half dozen of these investigations would be released over the next three months. Topics of the cases include Czech/French chemical detections, a Khamisiyah update, oil well fires, depleted uranium, insecticides/pesticides and medical record keeping. It is hoped that the results of these inquiries will benefit veterans affected by Gulf War illnesses and that the weaknesses identified here in the case narrative process are corrected and improvements made in forthcoming products.

CONCLUSION

There is much evidence suggesting that the Department of Defense could have done a much better job of monitoring the health of its deployed personnel, training personnel to avoid or protect themselves against certain health risks, and reacting in a more timely manner to the post-conflict concerns of Gulf War veterans, active duty personnel, the news media, the public, and the Congress.

In the effort to move personnel and equipment to the Persian Gulf region, the Defense Department experienced logistical and technological shortfalls in personal protection equipment, including supplies of protective overgarments, effective chemical alarms, and Fox vehicles. There were significant communications gaps between DOD and intelligence community staffs which led to misdirections and lost opportunities to inform troops of possible chemical weapons threats. Records-keeping policies and procedures were inadequate and lacked accountability. The Khamisiyah demolition and follow-up were poorly coordinated and documented from beginning to end. This led to confusion about the event between DOD and intelligence community staffs, further fueling Gulf War veterans' skepticism the government's ability to be open and honest about possible causes of illnesses. All of these shortfalls must be addressed if the health of veterans of future conflicts is not to be brought into question by a potential lack of readiness, monitoring, and recordkeeping by the military.

RECOMMENDATIONS

1. The Secretary of Defense should create a single focal point in the unified commands to gather, analyze, and report all intelligence information in support of any military operation in order to avoid the information sharing and communications failures that occurred during the Gulf War. The Director of Central Intelligence must fully coordinate and cooperate in ensuring this unified approach.

2. Training of and instructions to intelligence analysts at the Central Intelligence Agency, Defense Intelligence Agency, and Department of Defense should ensure awareness of historical and collateral facts and situations that may affect how they interpret and handle intelligence data.
3. The joint DoD/CIA Khamisiyah plume modeling effort, and future similar efforts, should be peer reviewed by experts from inside and outside of government and the results of that peer review made public.
4. The Secretary of Defense must make chemical and biological warfare training a high priority to remedy equipment, medical, and other readiness shortfalls that occurred during the Gulf War and continue today.
5. The Secretary of Defense should establish troop training and safety programs to minimize possible health hazards from contact with depleted uranium.
6. The Secretary of Defense should reinforce compliance with current statutory and regulatory requirements that all records, logs, and other documents related to wartime and other military operations that are permanent records under the law are retained, and require that all unified commanders demonstrate this duty is being implemented and understood as a priority at every level in that command.
7. The Secretary of Defense should implement a personnel tracking system, such as that now being developed by the U.S. Army Center for Health Promotion and Preventive Medicine, in order to track and identify where individual service members were located during military operations.